RED FLAG: HOW THE RISE OF "REALISTIC TRAINING" AFTER VIETNAM CHANGED THE AIR FORCE'S WAY OF WAR, 1975-1999

by

BRIAN DANIEL LASLIE

B.A., The Citadel, 2001
M.S., Auburn University at Montgomery, 2006

AN ABSTRACT OF A DISSERTATION

submitted in partial fulfillment of the requirements for the degree

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Abstract

This dissertation examines how changes in training after Vietnam altered the Air Force's way of war. Specifically, the rise of realistic training exercises in the U.S. Air Force, particularly in the Tactical Air Command, after the end of the Vietnam conflict in 1975 ushered in a drastic increase in the use of tactical fighter aircraft to accomplish Air Force missions. Many scholars, including Benjamin Lambeth and Richard Hallion, have emphasized the primacy of technological developments in the renaissance of air power between Vietnam and the Gulf War. This neglects the importance of developments in training in the Tactical Air Command during the same period. This dissertation demonstrates that throughout the 1970s and 1980s Air Force leaders reconsidered some of their long-held assumptions about air power's proper use and re-cast older ideas in ways that they considered more realistic and better justified by past experience. Realistic training exercises led to better tactics and doctrines and, when combined with technological advancement, changed the way the Air Force waged war. Tactical assets became the weapons of preference for Air Force planners for several reasons including their ability to precisely deliver munitions onto targets and their ability to penetrate and survive in high-threat environments. Tactical assets could accomplish these missions precisely because of the changes that occurred in training. At the same time, the rise of tactical assets to equality with strategic assets directly led to the demise of both Tactical Air Command and Strategic Air Command and the creation of the single Air Combat Command.

The conventional view that a massive technological revolution in military affairs took place in the 1980s and led to success in Desert Storm is conceptually too limiting. That interpretation places too much emphasis on the technological advancements used to prosecute

war and slights the experiences of the airmen themselves in the development of the training exercises that helped change how the U.S. Air Force waged war.

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Major Professor
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As Thucydides so wisely told us, " the endeavor to ascertain these facts was a laborious task, because those who were eyewitnesses of the events did not give the same reports about the same things, but reports varying according to their championship of one side or the other, or according to their recollection." Any mistakes found herein are mine and mine alone.

Dedication

To Heather, without whom I never would have taken on higher learning in the first place and the single greatest contributor to the motivation and dedication needed to write this; to Savannah, who allowed me to be a stay-at-home dad as well as a student of both history and her growing up; and to Aspen, who arrived late in the game but whose contributions nonetheless made this work possible. I love you all.

Preface

The subject of this study is changes in training in the Tactical Air Command and the U.S. Air Force from the end of the Vietnam War in 1975 through military conflicts of the 1990s, including Operations Desert Storm, Deliberate Force, and Allied Force. Some scholars and public figures, such as Benjamin Lambeth of the RAND Corporation and former Air Force Chief Historian Richard Hallion, have emphasized the primacy of technological developments in the renaissance of air power between the Vietnam War and the Gulf War. Although these authors do not ignore developments in training, it is not their primary focus, and this perspective neglects the centrality and importance of developments in training and the impact these training changes had on tactics and doctrine. This work will primarily focus on developments in training while not ignoring the importance of advancements in technology. Throughout the 1970s and 1980s, some leading figures inside the Air Force reconsidered some of their long-held assumptions and recast older ideas in ways that they considered more realistic and better justified by past experience.

An air force may succeed or fail for many reasons. In the aptly named book *Why Air Forces Fail* (2006), esteemed historian Robin Higham listed many tangible and intangible influences on a country's ability or desire to build and equip an air force, including:

> …influence of prophets, parsimonious political pacifism, preconceptions of all sorts and at all levels, personalities, purges, racism, doctrine, understanding of the operational art, wastage and consumption, wartime dilution at all levels, preparations for war, lessons of the last war, demobilization, and the realism of exercises and war games.[1]

[1] Robert Higham and Stephen J. Harris, eds. *Why Air Forces Fail: The Anatomy of Defeat* (Lexington, Ky.: The University Press of Kentucky, 2006), 4.

Clearly this is but a short list of the external and internal influences on an air force. The myriad of elements that make up a successful air force are much harder to examine than the conduct of a particular air force over the battlefield. Combat operations are easier to analyze, at least with the element of hindsight, with one side the victor and the other the loser. The creation and training of an air force are, as indicated above, much more complicated. While combat operations will be examined in this work, it is focused more on how the development of a particular air force came about. This study examines developments in the U.S. Air Force especially in how it trained its air crews but also in technology in the period from the end of the war in Vietnam through the major air operations of the 1990s.

This study will show three things. First, and most important, after the Vietnam War, the Air Force made significant changes to training methods that led to better tactics and doctrine. These changes in training came in the form of new training exercises, most notably Red Flag, the creation of dedicated squadrons teaching combat tactics used by prospective enemies, and in the opportunity for an elect few fighter pilots to train against actual enemy aircraft. This new training, which greatly increased the realism in the exercise scenarios, also presumed the acceptance of an increased level of risk and more closely resembled combat. The transformation in training better prepared pilots for combat in the 1990s. Second, the specific changes in training, primarily inside the Tactical Air Command, in combination with technological advancement changed not only the way the Air Force waged war but also overturned traditional theories of air power that had existed since the earliest days of flight. The way the Air Force trained for combat was no less essential to preparing for combat than were concurrent technological developments. In the decade after American involvement in Vietnam had ended, the separation between “strategic” and “tactical” uses of air power gradually disappeared as roles

and missions combined. As technology and training blended, so too did the need for a separate Strategic Air Command and Tactical Air Command. It took nearly twenty years for the justification for eliminating the two commands to mature and come to fruition.

After the Korean War, the Strategic Air Command had received the most funding, not only within the Air Force but within the entire Department of Defense as well, since this element, by definition the "strategic" force, possessed the bombers capable of delivering nuclear weapons. By contrast, the Tactical Air Command provided fighters capable of shooting down other aircraft and of supporting troops on the ground. During the Eisenhower administration, the Strategic Air Command alone received nearly twenty percent of the Defense Department's budget, slightly less than the budget for the U.S. Army as a whole. This changed after the Vietnam War ended. Finally, this work will show that, as training changed air power both in theory and in execution, the tactical element of the Air Force rose to prominence over the traditionally dominant strategic component. In this regard, the Air Force's concept of itself, or its institutional identity, changed as well. This change in identity was capped by the activation of Air Combat Command in 1992. The creation of Air Combat Command was not a hostile takeover of Air Force ideology, culture, and identity by the Tactical Air Command, even though some Air Force officers, most notably John Warden, viewed it this way. More accurately, the creation of ACC was a corporate merger of two major commands into a pragmatic organization that held all of the USAF's combat air power.[2]

Although some authors, including Air Force historian C.R. Anderegg, labeled these events the revolt of the "iron majors," there was also a push for more realistic training from the top down. Tactically minded generals, including William W. Momyer and Robert J. Dixon,

[2] R. Cargill Hall, ed., *Case Studies in Strategic Bombardment*. (Washington, DC: Air Force History and Museums Program, 1998), 402; Paul R. Schratz, *Evolution of the American Military Establishment Since World War II* (Lexington, VA: George C. Marshall Research Foundation, 1978), 63.

made the changes in training possible by removing certain in-place restrictions, endorsing new exercises, and freeing up money and resources that the junior officers used to make their ideas a reality. The generals did not need to be convinced. The experience of Vietnam had impressed upon them the need for change.[3]

The training changes that occurred in the Air Force initially shifted the Air Force's "way of war" from a strategic concept to a tactical one, but this was replaced by what may be called simply "theater air war" as roles and missions combined. It is not that the focus on strategic bombardment was wrong, at least not in the early days of the U.S. Air Force. The tactical fighters in service after World War II, were incapable of delivering the same battlefield effects that bombers were. This changed with the advent of jets, missile technology, and the ability to deliver munitions with precision. Furthermore, as historian Martha Byrd states in her biography *Chennault* (1987), the ability to deliver a particular result "depended on technology, on the relative speed, range maneuverability, and firepower of bombers and pursuit planes at any given time." During and after the Vietnam conflict, the ability of strategic bombers to deliver results during combat operations was quickly replaced by the ability of smaller tactical fighters to do the same. This is not because tactical fighters were more technologically advanced than bomber aircraft, but because TAC placed such emphasis on training its pilots for combat. This paradigmatic shift affected every aspect of the Air Force as an institution after the Vietnam war ended, and the changes in training that occurred during this shift directly led to the successes in combat during the 1990s.[4]

Former Air Force Chief of Staff General T. Michael Moseley said that the U.S. Air Force's senior leaders prior to and during the Vietnam conflict had "priorities centered primarily

[3] C.R. Anderegg, *Sierra Hotel: Flying Air Force Fighters in the Decade after Vietnam* (Washington, D.C.: Air Force History and Museums Program, 2001), 89.
[4] Martha Byrd, *Chennault: Giving Teeth to the Tiger* (University of Alabama Press: 1987),45

on nuclear delivery…and minimizing peacetime training accidents." The reasons for this aversion to risk will be explored later. The fear of losses in training outweighed the fear of losses in combat, no matter how incongruous that sentiment might seem in 2013. However, SAC and Air Force senior leaders might be forgiven for this aversion to risk since it made perfect sense with how they thought about preparing for combat in the 1950s and 1960s. SAC assumed that the next war would be mainly a nuclear exchange using SAC bombers. Every bomber lost to a training accident was one fewer asset available to deliver munitions during combat. It was not until combat losses began to rise in Vietnam that this cognitive dissonance among Air Force leaders was resolved.[5]

Historian Donald Mrozek once stated, "The ultimate limits of innovation are set in the human mind and in the environment of prevailing policy—unfortunately all too often tied only loosely to the material needs of forces deployed. The limits in the hardware that we develop are more easily overcome than those inherent in our own 'human software.'" After Vietnam, the Air Force developed for the first time in two decades fighter aircraft, the F-15 and F-16, designed specifically for air superiority. These aircraft overcame the technical limitations that had been experienced in the Vietnam War. At the same time the Air Force, or more specifically the Tactical Air Command, reprogrammed its own "human software" in how it trained pilots to conduct warfare.

Large-force exercises, including Coronet Organ and Red Flag, simulated combat experience to a degree never before achieved nor even believed to be in the realm of possibility in training for air warfare. The idea was to make training so realistic that it substituted for the first ten actual combat missions, after which a pilot's life expectancy in a real combat situation drastically increased. The Air Force that went to war in the 1990s was not just technologically

[5] Steve Davies *The Red Eagles of Project CONSTANT PEG* (Oxford. U.K.: Osprey Publishing, 2012), 11

advanced; it was also far better trained to perform combat than any of its adversaries and, in some cases, better than its allies as well. New methods of training represented the perfect melding of technological innovations and the "human mind/environment of prevailing policy." Both junior and senior officers infused into the Air Force something that had been missing for far too long: innovation in training. From the top down, as well as from the bottom up, the Air Force inculcated new ideas in a younger generation of officers. Dedicated officers used new training exercises to teach tactics in a realistic environment that challenged preconceived notions of preparing for war. The generation of fighter pilots that came of age after Vietnam, commonly called the "fighter mafia," became coequal with their counterparts in SAC known as the "bomber mafia."[6]

The Air Force had long suffered from an identity crisis. Its separation from the Army in 1947 left a constant fear among U.S. Air Force members that this was but a temporary separation that could be reversed. The fear had less to do with evolving roles and missions over time, which occurred in all services, as it did with the thought the USAF might cease to exist as a separate service. The possibility of such a reversal was expressed as recently as 2011 when former Air Force intelligence officer and historian Earl Tilford stated in *The Small Wars Journal* that "Among the first steps should be the re-integration of the US Air Force back into the Army…. The US Air Force, as we know it, is rapidly approaching the fate of the Roman Legion." Benjamin Lambeth of the RAND Corporation spent considerable time opposing the Army's attempt to appropriate "many of the long-acknowledged distinguishing features of air

[6] The "10 Mission" rule was derived from the Red Baron reports and used as a justification for the Red Flag exercise in 1975 by Major Richard Suter. It is still used in briefings as the primary purpose for Red Flag in 2013: 57th Fighter Wing History Office, "Red Flag" Briefing, May 2011; 57th Fighter Wing History Office, 414th Combat Training Squadron briefing , "Red Flag Today," March 2012; Donald Mrozek, "The Limits of Innovation: Aspects of Air Power in Vietnam," *Air University Review*, 36, no.2 (1985): 58-71. http://www.airpower.au.af.mil/airchronicles/AURIndex.html#M

power" in his book *The Transformation of American Air Power* (2000). Much earlier, the fear had shown itself in the debates on building an aircraft exclusively for close air support of the Army. General William Momyer had written to Air Force Chief of Staff General John Ryan that building what became the A-10 would give the Army grounds for usurping Air Force missions. It was an unfounded but ever-present fear. Between 1947 and 1990, Air Force leaders continually worried about who they were as an institution and just what sort of "air force" they should provide. Too much focus on tactical aviation, both in the form of close air support aircraft and air-to-air fighters, might mean being subsumed back into the army. These fears were resurrected with Army's advancement of the AirLand Battle in the 1970s and 1980s. [7]

After its separation from the U.S. Army in 1947, the Air Force clearly focused on building, and billing themselves as, a strategic air force. The strategic air force of the 1950s and 1960s made some sense given the geo-political realities of the time, but the U.S. Air Force's experience in Vietnam changed the view of what to expect during combat. In short, air-to-air defenses proved to the Air Force that it needed to adapt its arsenal and the way it trained for combat. Changes in training and technology that occurred after the Vietnam War thus allowed senior leaders in the Tactical Air Command to entertain ideas about how to operate that might have been dismissed out of hand earlier, because entertaining those ideas would have felt like signing the death warrant for one's own hard-won independence. Tactically minded pilots helped create an Air Force better prepared to conduct the conflicts of the 1990s. Members in SAC also recognized the need for changes to training but the cognitive dissonance suffered by members of SAC took longer to overcome than it did TAC fighter pilots. The same way that

[7] Octavian Manea, "The Use of Air Power in Limited Wars; Interview with Professor Earl H. Tilford, Jr." *Small Wars Journal*, published online 24 May 2011, retrieved 25 Jan 2013: http://smallwarsjournal.com/blog/journal/docs-temp/771-manea.pdf; Benjamin Lambeth, *The Transformation of American Air Power* (Ithaca, N.Y.: Cornell University Press, 2000), 285; General John Ryan Files, Air Force Historical Research Agency, 168.7085, folder 61.

General Momyer, while head of TAC, had to change the way the organization perceived itself, SAC had to be forced to change its perception of itself through participation in TAC exercises.

The conventional view that a revolution in military affairs that took place in the 1980s led to success in Operation Desert Storm is too limiting in conception. This theory of a supposed revolution places too much emphasis on the technological advancements used to prosecute war, and it slights the experiences of the airmen themselves in the development of the tactics that affected the planning and execution of air campaigns. It was not only the technological advancements but also a new way of thinking about how to *use* new technologies during training events that allowed the Air Force to achieve the successes in air campaigns of the 1990s. This work is concerned with the development of new concepts of aerial warfare. This study treats warfighting less as a science than as an art. In essence, the focus is on human more than on technological factors.

In 2000, air power historian Benjamin Lambeth argued in his work *The Transformation of American Air Power* that in the decades following Vietnam "American air power has experienced a nonlinear growth in its ability to contribute to the outcome of joint operations" and that "American air power now possesses the wherewithal for neutralizing the enemy's means...through the functional effects achievable by targeting his key vulnerabilities . . . ." Lambeth argued that air power, using solely conventional means, had the ability to force decisions from America's enemies due in large part to advantage in technology. In Lambeth's defense, air power advocates had held similar views for decades before Lambeth made his claim. Still, this view divorced technology from human control. Lambeth cites as the sources for this transformation the development of low-observable technology and advancements in command,

control, communications, computers and information, surveillance, and reconnaissance, or C4ISR in military parlance.[8]

Benjamin Lambeth's work and others like it exude an element of technological determinism, and this permeates the works about air power and the air campaigns of the 1990s. Too often, the focus of air power histories is on technology as hardware, such as the F-117 stealth fighter or cruise missiles. These histories often use "technology" as an all-encompassing term for weapons platforms and communications systems. In fact, one member of the Air Force stated in 1987 that:

> Technology has taken us from clear weather, by-guess-and-by-golly, to all weather, day or night, pinpoint-accuracy bombing, providing the destructive force of a 500-pound bomb or an area weapon meets your definition of pinpoint. Technology also allowed us the latitude to expand exponentially the means used to fight. We fly great distances at great speeds and deliver tons of ordnance with an efficiency that Billy Mitchell would not have dreamed of, although what is now reality is certainly an extension of his dream.[9]

What is described here is technology as an independent actor without any meaningful involvement of the human element. This perspective is, at best, a view of technology as a panacea and catch-all, and, at worst, it is the willful removal of the contributing factors of man in his own experience. Air power historian James S. Corum stated in his biography on Wolfram von Richthofen that:

> It is perhaps the nature of airpower history, which tends to overplay the importance of technology and underplay the human element in warfare, to ignore the role of important air force commanders. If one looks at the military history section of any major library, or

[8] Benjamin Lambeth, *The Transformation of American Air Power*, 6-7.
[9] William P. Stroud, "Use and Misuse of Conventional Tactical Air Power," *Airpower Journal* Vol. I, no. 1 (1987). http://www.airpower.au.af.mil/archives.asp?year=1980

> in any bibliography of airpower history, one will see airpower history centers on airplanes.[10]

The use of particular technologies in combat is foundational and important to an understanding of the American experience at war, but the human element is crucial and so is how this element prepared for war during the 1970s and 1980s.

Even the recent masterful work *A History of Air Power*, edited by John Andreas Olsen, skips development of all kinds in the American air arm after Vietnam. One chapter comprehensively describes Vietnam and another details the events of Desert Storm. What happened in the intervening period is filled in with operations by Israel in the Arab-Israeli Wars between 1967 and 1982 and the Falklands Campaign of 1982 by Great Britain. The chapter after Desert Storm presents the reader with a fully modernized, technologically advanced, and well-trained air arm capable of systematic destruction of the Iraqi war machine. How? What happened in the intervening fifteen years?[11]

What is missing in these accounts stems from their view of technology. In 2004, Thomas P. Hughes described technology as a "creative process involving human ingenuity." However, in most historical studies of the development of air technology in the past few decades, the human element, although present, is underplayed in favor of the machine. The roles and influence of the airmen who had a hand in developing how these weapons would be employed are missing. The truth is that technology is not an independent actor. Technology is nothing more than an expansion of the current state of human ingenuity, driven by what humans have decided, largely in advance, that they wish to pursue (although there do exist many examples of technology taking a different approach from the one humans had initially intended.). All too often, a

[10] James S. Corum, *Wolfram Von Richthofen: Master of the German Air War* (Lawrence, KS: University Press of Kansas, 2008), 1
[11] John Andreas Olsen, ed., *A History of Air Warfare* (Washington, D.C.: Potomac Books, 2010).

historical study records that an aircraft shot down another aircraft or dropped a bomb on a target. These actions are impossible without human intervention. An aircraft, even an unmanned aerial vehicle in 2013, is incapable of doing anything in the absence of a human controller. Even a satellite thousands of miles above the Earth's surface has been put together and set in motion by the hands of its creators.[12]

Missing from many histories of American air power are the contributions of air power leaders and advocates from the 1970s and 1980s. The following pages will bring to light some unrecognized contributors who aided in the rise of tactical air power in the wake of Vietnam and also will argue that what has been written about junior officers having to "convince" senior leaders to focus more on the tactical dimension is likewise incorrect. If not for the help of senior officers on the Air Staff at the Pentagon and at Tactical Air Command, many of the changes that occurred after Vietnam might not have happened.

The outcome of the war with Iraq in 1991 displays what Hughes called the "technological sublime" in which military personnel, in particular members of the Air Force, and members of the general public took pleasure in the sights and sounds of demonstrated air superiority over a much weaker nation. The perception that was portrayed to the American public through the media was the defeat of a technologically inferior military, despite the advanced state of Iraq's integrated air defense system and their thoroughly modern air force. The technological sublime, in turn, led to an enthusiasm for technology in which proponents of air war cited it as a new way of warfare. Many writers and other enthusiasts focused on technology and ignored changes in training that aided in the conduct of the war.[13]

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[12] Thomas P. Hughes, *Human Built World: How to Think About Technology and Culture* (Chicago: University of Chicago Press, 2004), 3.
[13] Thomas P. Hughes, *Human Built World*, 38.

After the Gulf War, many spoke of the "revolution in military affairs" that had taken place with virtually no discussion of the development of operational and tactical training exercises between the end of the Vietnam War and the start of the Persian Gulf War. Individuals who helped foster the new way in which the Air Force trained for war were also overlooked. There was certainly a revolution, but it is one that needs fuller treatment. As Mark Mandeles stated in *The Eagle in the Desert* (1996), "A military revolution…depends on an organizational design capable of supplying appropriate and timely information to decision makers and operators."[14]

This study traces the development of the employment of aircraft and aerial training exercises through the eyes of air personnel all the way from those who had experienced air combat in Vietnam to those who led and executed Desert Storm. Along the way, the study emphasizes the roles of individuals and organizations. It also focuses on changes in doctrine, tactics, and, most importantly, training that impacted the operational concepts of the Air Force in the 1970s and 1980s. This change in training was developed by junior officers, and general officers helped it come to fruition. This study explores training areas and testing ranges such as the USAF Fighter Weapons Schools at Nellis Air Force Base in Nevada, as well as large force employment exercises such as Operation Red Flag, and it notes several specific developments that show why the rise of realistic training exercises help explain success in the Gulf War.

Many studies about air power studies are "official histories," sponsored by the several services and usually written by staff members employed by them. For the Air Force, key publications have often come from the Air University Press and the Air Force History and Museums Program. In their comprehensive work *For the Common Defense*, Allan Millett and

[14] Mark Mandeles, "Command and Control in the Gulf War: A Revolution in Military Airpower," *The Eagle and the Desert: Looking Back on U.S. Involvement in the Persian Gulf War*, eds. William Head and Earl H. Tilford Jr., (Westport, Conn.: Praeger Press, 1996).

Peter Maslowski call these "court histories," and note that many of these works were either too "celebratory or cautionary." The present study illustrates both the successes and the failures of the Air Force as an institution.[15]

This study complements the existing literature by adding to what has previously been written, filling in a hole in the historiography, and it more fully explores the complex relationship between people and technology and how the combination of the two led to success in the skies over Kuwait and Iraq and later over the Balkans. There are many superb studies about the 1991 Persian Gulf War, including Diane Putney's *Air Power Advantage: Planning the Gulf War Air Campaign*, Richard P. Hallion's *Storm Over Iraq*, and William Head and Earl Tilford's *The Eagle in the Desert*, to name a few. There are also the four volumes of the *Gulf War Air Power Surveys*. Less has been written about air power in the Balkans conflicts. This is due, in part, to classification levels of original source documents.[16]

Did the American way of conducting air warfare change from older long-held notions after the end of American involvement in Vietnam thanks more to technology or training? In 1990 during the lead-up to Desert Storm, how did Air Force planners develop an independent campaign planning process in light of the dominant AirLand battle doctrine of the time? Was the emphasis on facing the Soviet Union in large-scale battle during the Cold War a help or hindrance to developing the necessary training events to defeat the perceived enemy? These questions, along with others, lead down a path demonstrating that a new generation of officers in the 1970s and 1980s created new training methods that were more tactically focused.

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[15] Allan R. Millett and Peter Maslowski, *For the Common Defense: A Military History of the United States of America* (New York, NY: Free Press, 198); Richard Hallion, *Storm Over Iraq* (Washington, D.C.: Smithsonian Institute Press, p. ix).
[16] Richard Hallion, *Storm Over Iraq*, ix.

In the end, this work demonstrates that, just as massive technological development allowed for success in the Persian Gulf War, there was an equally important development in the way air power operators and planners conceived of and trained for aerial warfare. This change in training better prepared pilots for combat, and, when combined with the technological developments, it brought forth a new way of warfare, neither strategic nor tactical, that was better able to impact the outcome of any military campaign in which it was applied. Although this study may be of special interest primarily among military historians and those specifically interested in air warfare, it will also benefit those interested in the relationship between humans and technology. Those who have an interest in "Kuhnian" theory as it applies to military history may also find this work of interest. Thomas Kuhn's theories on paradigm shifts will be present in this work, although it needs to be acknowledged that the treatment of change occurring over time is in contradiction to much of Kuhn's arguments. Still, much that occurred in the Air Force during the Vietnam conflict and after it exemplifies Kuhn's work on the scientific community. After all, as Kuhn stated in his landmark *The Structure of Scientific Revolutions* (1962), "no natural history can be interpreted in the absence of at least some implicit body of intertwined theoretical and methodological belief that permits selection, evaluation, and criticism."[17] Although Kuhn was discussing natural history, the training that occurred at Red Flag was very much about the selection, evaluation, and criticism of the accepted beliefs present in the Air Force at the time.

One of the primary problems with the study of air power over time is the ever-changing definition of words and phrases as they are commonly used among Air Force thinkers and leaders. As air power historian David Mets succinctly put it, the problem lies in "imprecise

[17] Thomas S. Kuhn, *The Structure of Scientific Revolution* (Chicago, IL: University of Chicago Press, 1996 [1962]), 16-17.

definitions and multiple definitions of the same word or term (that) make much of the literature on the sources of strategic-bombing theory and doctrine seem confusing." In short, what was considered "strategic" in the 1940s may fit a definition different from ones used in the 1970s, 1980s, or later times. This work will attempt to use definitions of words whose meaning has been stabilized.[18]

There is no doubt that the effects caused by changes to training in the Air Force were "revolutionary." The dominant paradigm within the Air Force, the focus on strategic bombardment, was overturned. The change in the dominant paradigm occurred because of training and technological advancements. David Mets said in his book *The Air Campaign* (1998) that a revolution in military affairs occurs during

> …a rapid and large improvement in the equipment used in combat and support of combat, often by the combination of several technologies in a new way over a short period of time.

This study shows that Mets' definition of a "revolution in military affairs" is too limiting and should be viewed in a larger contextual framework. For there to be a true revolution the old way of doing things must be overthrown. If a revolution in military technology occurred after Vietnam, so too did a revolution in military training. The changes in training caused the true revolution.[19]

A few other terms bear emphasizing here: strategic, operational, and tactical. In early twenty-first century parlance, these have been understood as the "levels of war." The term "strategic," most commonly identified in the Air Force with bomber aircraft and intercontinental ballistic missiles (ICBMs), will also be used primarily in this work as a type of attack. Thus, a

[18] David R. Mets, *The Air Campaign: John Warden and the Classical Air Power Theorists* (Maxwell Air Force Base, Ala.: Air University Press, 1998), 7.
[19] David R. Mets, *The Air Campaign: John Warden and the Classical Air Power Theorists*, p.8.

strategic attack is any employment of a weapon system against a target that can have large effects on political positions or on the overall operation of the campaign. It was no mistake that the Strategic Air Command was thus named, since it was, early on, the only organization in any service capable of delivering strategic effects against the Soviet Union. The use of strategic weapons in an attack, however, does not guarantee operational or strategic impact. For decades, strategic attack meant primarily the use of bomber aircraft. These bombers were designed during the Cold War to carry nuclear munitions, and, by association with the munitions they carried, the planes themselves came to be described as strategic assets.

War at the operational level takes place in a theater which includes one or more countries. At the operational level a campaign plan is applied to defeat an enemy. Tactical is the lowest level of war, which pits man against man or larger military units including squadrons and wings against other like-sized units. This work is concerned primarily with how the changes that the Air Force made in its training programs after the Vietnam War fundamentally altered air warfare as a tool of military operations. Strategic air power and tactical air power ceased to exist, and theater air power rose to prominence. This transformation could not have occurred without the changes in training that began exclusively in the tactical community.

The title of this study is--*Red Flag*-- is apt for three reasons. First, it is a history about how developments in training--most notably those that occurred at the Red Flag exercise--in the Air Force after Vietnam changed the service's way of war. Second, participation in Red Flag and other exercises was crucial to the development of the air plan for Operation Desert Storm; thus, the Red Flag exercise greatly influenced combat planning and execution. Finally, this study demonstrates the way in which exercises conducted by the Tactical Air Command helped to end the dominance long held by the Strategic Air Command. The changes in training and in

the execution of combat operations led TAC to become coequal with SAC before the two were combined into Air Combat Command. The early parts of this study focus on changes that occurred in Tactical Air Command. The final sections focus on the establishment of Air Combat Command (ACC) and demonstrate that ACC was a pragmatic and important organizational change that allowed for better application of air power during combat. This study is more about the providers of the forces -- Tactical Air Command, Strategic Air Command and Air Combat Command -- than about the users, who came to be called *combatant commanders*. The combatant commanders did, however, benefit from the changes in training when they applied air power during combat operations.

This study generally follows chronological order with deviations, as necessary, to focus on certain technological developments and tactical changes. Chapter One focuses on the role of tactical air power in Vietnam with particular emphasis on air-to-air engagements. The chapter demonstrates that Tactical Air Command failed at the time to recognize that the lack of realistic training prior to deployment directly contributed to loss of aircraft and life during the time American combat troops were involved in Vietnam.

Chapter Two traces the tactical and doctrinal changes that occurred in the Air Force through the 1970s and 1980s and focuses on the development of new opportunities to train, including dedicated "aggressor" squadrons and the chance for some American pilots to dogfight other American pilots flying enemy aircraft in training simulations. Chapter Three places all of the training that began after the end of American involvement in Vietnam into the context of new large-force exercises designed to simulate combat at operational-level exercises, such as Red Flag. Chapter Four examines the development of new aircraft in the wake of Vietnam, including the advent of stealth technology. Chapter Four also details how new technologies were

incorporated into training exercises. Chapter Five looks for what, if any, impact real-world operations occurred as a result of changes to Air Force doctrine during the "small wars" of the 1980s. In other words, were there results seen in the Libyan and Panamanian conflicts? By focusing on real-world events, including Operation El Dorado Canyon, this section demonstrates that tactical exercises had a direct impact in Libya but not so much in Panama or Grenada.

Chapter Six focuses on the planning and execution of Operation Desert Storm and argues that the myth that stealth and other technologies were the primary factors that led to victory so quickly is not an entirely accurate one. Following this discussion, Chapter Seven demonstrates that Desert Storm ushered in a new form of aerial warfare based upon the revolution in training that exploited the new advanced technologies of the 1970s and 1980s. Chapter Eight explores what the Air Force took to be the lessons it should learn from Desert Storm. In both internal and external communications, the Air Force's self-adulation in the early 1990s resulted in an aggrandized view of the ease with which air power could accomplish great tasks, and advances in training took a backseat to technology in presentations that leaders in the Air Force gave in Congressional hearings. The training revolution was ignored and the technological revolution became the focus in these hearings. Yet, despite the overemphasis on technology after the war ended, the Air Force was able to make some meaningful organizational changes. Possibly the most beneficial result was the creation of Air Combat Command, covered in Chapter Nine. Chapter Nine also covers Operation Deliberate Force and Operation Allied Force. Both were successful operations, but certain Air Force training exercises proved to have limitations during combat. What becomes clear, however, is that, after Desert Storm, the creation of Air Combat Command was a pragmatic decision by Air Force leaders based upon results from combat operations and in response to the changes in training and in technology that made the old ways of

distinguishing between "strategic" and "tactical" obsolete. The Conclusion reemphasizes the primary importance of training Air Force pilots for combat operations.

Innovation is one way for an air force to overcome its past experiences, but innovation often comes at a cost to an established identity or mission. The intervening periods between conflicts are not devoid of change. During this time Air Force personnel train and prepare for what they perceive to be the most likely contingencies possible. After Vietnam, the Air Force experienced a paradigmatic shift in the way that it conceived of and trained for future conflicts. The loss of aircraft during the American involvement in Vietnam was the Kuhnian anomaly that subverted "the existing tradition of scientific practice…the tradition-shattering complements to the tradition-bound activity of normal science…" for the U.S. Air Force. Air warfare as it had been understood by early theorists was struck down. The focus shifted away from a bomber force and towards a tactical one. Through training, the tactical and strategic forces merged operations. Once tactical air power reached equilibrium with strategic air power the terms lost meaning. There was simply theater air power. In total, the air force changed its way of warfare and its entire identity. However, the change occurred not only because of advanced technologies, but also through human intervention in determining how those technologies would be used. In reality, the changes in training became a trump card against which enemy combatants held no answer. The hand of man was always present, if overlooked, in how the Air Force changed between Vietnam and Desert Storm.[20]

[20] Thomas S. Kuhn, *The Structure of Scientific Revolution*, 6

CHAPTER 1 - USAF Pilot Training and the Air War in Vietnam

The most important contribution to loss of USAF aircraft and personnel during the Vietnam conflict was inadequate training prior to and during the war. Historian Mark Clodfelter said in his work *The Limits of Air Power* (1989) that "Air Power was ineffective throughout the end of the Johnson era of the Vietnam War because both civilian and military leaders possessed preconceived ideas that affected its application." Clodfelter's comment should be extended through the end of the American experience in Vietnam. The use of air power throughout the Vietnam conflict was ineffective. Poor organization, command and control, and unity of command all contributed to aircraft losses in Vietnam but these were not as significant as the lack of proper training for fighter pilots. The U.S. Air Force, particularly those in SAC, entered the conflict in Vietnam believing that the air war in Korea had been an anomaly, in that it was neither a conventional war with the Soviet Union in Europe nor an exchange of nuclear weapons. Air Force leaders believed that tactical aviation, meaning fighter aircraft, could best serve in the role of protecting bombers as escorts or be turned into little bombers themselves. An entire generation of aircraft known as the Century Series was specifically designed to perform bombing missions. The preconceived notions of how air warfare should be conducted and the way in which the U.S. Air Force prepared its pilots in the 1950s and 1960s were proven wrong during the war in Vietnam. The emphasis on the strategic bomber mission to which the Air Force still clung contributed to loss of life among tactical fighters during the conflict because the fighter pilots were not properly trained. [21]

During the Vietnam War, Air Force pilots, especially tactical fighter pilots, did not have the proper training to conduct the missions required of them. Although air combat training for

[21] Mark Clodfelter, *Limits of Air Power*, 209.

pilots prior to deployment did occur, it did not sufficiently cover the types of missions actually encountered. The training was so poor that American fighter pilots entered combat ill-trained to defeat the men and hardware they encountered. Vietnam combat pilot and later Air Force Chief of Staff, General T. Michael Moseley stated in 2012 that the air war over Vietnam "was singularly characterized by a lack of focused American air combat preparation and, to a certain extent, a lack of experienced, tactically savvy leadership." Even worse, General Moseley said, "…the USAF chose not to prioritize or even emphasize tactical leadership development, advanced air combat training or the most basic of combat preparation." In short, American pilots were not prepared to engage with and destroy the enemy. This applied to SAC pilots flying B-52s into territory densely populated with SAMs but more especially to the TAC pilots engaging enemy MiGs and SAMs.[22]

By any standards, the United States clearly led in every conceivable area related to hardware: state-of-the-art aircraft with advanced radars, beyond-visual-range missiles, close-in heat-seeking missiles, refuelers, heavy bombers, surveillance and reconnaissance aircraft, and, later in the war, precision-guided munitions. Despite such great advantages, the USAF suffered heavy losses during the Vietnam conflict. Air Force pilots were ill-trained to conduct combat operations. Clodfelter postulates in *The Limits of Air Power* that there was no way in which the Air Force could have achieved military victory in Vietnam, at least not with the mentality to which Air Force leaders clung. The simple fact is that for the United States the engagement in Vietnam was limited, albeit costly. For North Vietnam, it was a war for the unification of Vietnam and of national importance.[23]

[22] T. Michael Moseley quoted in: Gaillard R. Peck, Jr. *America's Secret MiG Squadron*, 11.
[23] Mark Clodefelter, *Limits of Air Power*, xiii.

Air Force leaders lobbied hard to get into the war. General Curtis LeMay went before the Congress to press for an independent air strategy in Vietnam. LeMay's perspective was that, if the Air Force were given a free hand, it could force an end to the conflict through the use of strategic bombing. LeMay personally oversaw the development of the target list inside the Pentagon. The initial target list was executed during operation Rolling Thunder. In addition to bombers, the Air Force also used tactical fighters to attack targets as part President Johnson's strategy. The pilots flying these aircraft, which had originally been designed as interceptors or as vehicles for delivery of nuclear weapons, found themselves conducting missions they did not have the proper training to complete.[24]

Evidence exists showing that the Air Force recognized early on that the bombing campaigns were not working as planned and that the U.S. military did not enjoy air superiority over Vietnam. By the middle of 1965, tactical fighters were being lost at an alarming rate, more than twelve per month. Looking at it another way, it was the loss of an entire eighteen-ship squadron every one and a half months. At that rate, by the end of the year the Air Force would have lost twenty-five percent of the in-theater aircraft without any replacements. In 1965 alone, Tactical Air Command lost sixty-three aircraft in combat both in air-to-air engagements and by ground fire. Despite the loss rate, the 1965 Tactical Air Command history stated that the fresh-off-the-factory-floor "allotment of F-4 aircraft at 25 per month" was proving to be "sufficient to cover current loss rates." However, the Air Force recognized that the loss of aircraft was one thing, and the loss of the air crews was another matter entirely. To fix this problem, the Air Force decided simply to speed up the process by which it trained new pilots.

Combat losses of aircraft put a strain on Tactical Air Command's ability to adequately train and deploy squadrons. The training time to bring a squadron to combat readiness was

[24] *Ibid*, 76-77

slashed from twenty-six to six weeks. The problem of training pilots for deployment to Vietnam also complicated the ability to train new accessions to the pilot force. The troubles in 1965 continued unabated with little done to stem the bleeding. The year 1965 closed with a cumulative loss of 174 Air Force air frames, 16 air crew members killed, and another 35 missing. Tactical Air Command aircraft were especially hard hit, accounting for half of all losses.[25]

The loss of so many aircraft and air crews sent shock throughout the Department of Defense. In one memorandum Secretary of the Air Force Eugene M. Zuckert worried that the "credibility of our tactical air forces may be weakened in the eyes of some people who will interpret our losses as being unacceptable." Secretary Zuckert was not clear who he thought might interpret the losses. However, it seemed Secretary Zuckert was more concerned with perceptions than he was with the actual loss rate. Even though Zuckert recognized aircraft losses were heavy, very little in the way of concrete changes was forthcoming from the headquarters level.[26]

Tactical Air Command recognized that there was problem and knew that the problem was in the training pilots received prior to being assigned to Vietnam. The official history of TAC in 1965 stated "the OSD (Office of Secretary of Defense) and USAF decided that combat crew training programs were too costly and the money could best be used other ways." OSD and TAC decided it was enough for pilots to be at a level deemed "minimum acceptable," and the responsibility for improving crews combat readiness would be the field units. Every fighter pilot flying a tactical fighter in Vietnam was a product of Air Training Command's (ATC) training programs. After a pilot left ATC and arrived at a TAC training squadron to begin flying his

[25] Air Combat Command, Tactical Air Command Histories, 1965, vol. 1, 793-794; Air Force Association, "The Air Force in Vietnam," 2004, 9; ACC, TAC Files, Southeast Asia Review Files, "Southeast Asia Review: Final Issue," May 1974, 23-24.
[26] Air Combat Command, Tactical Air Command Histories, 1965, vol. 1, memorandum of conversation, Secretary Zuckert and Colonel William F. McBride, 8 Feb 1965.

fighter aircraft, that squadron did not have enough time to prepare a new pilot before he was sent to an operational unit or deployed overseas.[27]

In January 1965, Tactical Air Command, prompted by the general escalation of the conflict in South Vietnam, sought U.S. Air Force approval to make changes the Fighter Weapons School at Nellis Air Force Base. The FWS was where elite pilots were sent to become experts on their aircraft. The requested changes included increasing the number of required sorties per student and also training against a dissimilar aircraft rather than fighting the same type of aircraft the student was also flying. The recommendations contained in the study were rejected on the premise that sortie rates coming out of Southeast Asia did not warrant an extension of the school's resources. The effect of all of this sent the message to TAC that the USAF did not care about the fate of air crews. In fact, it seemed to TAC pilots that the USAF would preferred that aircraft were reaching proper generation rates and that this was more important than the fact that many of those same aircraft failed to return to base because they were being shot down. While the Tactical Air Command attempted to get changes in training authorized, the war in Vietnam continued to escalate and aircraft losses continued.[28]

The air war over Vietnam went through many phases, but the problem of poorly trained pilots in the tactical air force was never fully addressed. In the end, the Air Force came to recognize it had been bested by a country it considered to be a third world nation with less military capability and organization. In total, the Air Force lost 1,737 aircraft during combat. Of these 1,443 were to unspecified "ground fire," 110 to surface-to-air missiles, and 67 shot down by enemy aircraft. The Air Force only shot down 137 enemy aircraft garnering just better than a kill ratio of two to one. Tactical pilots faced two sets of enemy systems they were not properly

[27]Air Combat Command, Tactical Air Command Histories, 1965, vol. 1, 804
[28] Air Combat Command, Tactical Air Command Histories, 1965, vol. 1, 792, 804

trained to destroy. The first was the Soviet-built aircraft and the second was Soviet-built surface-to-air missiles. While the loss in Vietnam was the context in which dynamic changes in training came after the war, during the conflict these ill-trained pilots still had to face an enemy they were not properly prepared to fight.[29]

One problem that went beyond training and that plagued tactical pilots was that the aircraft they flew in Vietnam were not specifically designed as either air-to-air or air-to-ground platforms. The Century Series, were built for two purposes: to intercept Soviet bombers on the way to America and to deliver nuclear munitions. They could not compete with enemy fighters, were not ideal for air-to-ground operations and they were not adequately prepared to deal with the air defenses of North Vietnam. Even the air-to-air fighter F-4 was designed with a nuclear delivery capability in mind. With the Strategic Air Command dominating the Air Force in the 1950s and 1960s, Strategic Air Command's needs came first and at the expense of everything else. Thus, training programs for fighter pilots did not emphasize maneuvering to avoid surface-to-air missiles or how to properly dogfight against an enemy aircraft. Since these scenarios were not considered likely, they were not trained for.

Defeating the integrated air defenses surrounding high-value targets in North Vietnam could have been accomplished early in the war. The failing was not a technological one as much as a doctrinal and political one. Either way, the real problem for fighter pilots was a training one. Training units in the U.S. (RTUs) did not teach how to avoid SAMs or the proper method of destroying SAM sites. The Air Defense System over North Vietnam was completely Soviet in design, equipment, and operation. General William Momyer stated the following about the Soviet-designed air defense system:

[29] Air Force Association, "The Air Force in Vietnam," 2004, 17, 26.

> During the early days of 1965, it was in an embryonic state and could have easily been destroyed with no significant losses to our forces….Because of our restraint, the system was able to expand without significant interference until the spring of 1966, at which time systematic attacks were permitted against elements of the system. We were never allowed to attack the entire system.[30]

Still, from even as early as 1965, there was no ability to gain air superiority without the systematic destruction of the air defense network. Initially, pilots learned to defeat SAMs through a gyrating diving maneuver that defeated the SAMs targeting track. Pilots of heavily laden F-105s simply decided to forgo what they had been taught in the states (weapons delivery at medium altitudes) and approach targets at high speeds below 1,500 feet because as historian Earl Tilford phrased it, this was "less nerve-wracking and less physically demanding for them to fly low and fast whenever entering an area protected by SA-2s."[31]

Officers at Tactical Air Command recognized the need for changes in training and doctrine, but these changes took time. The loss of American aircraft and air crews helped new programs gain the momentum necessary to be implemented. The first loss of an aircraft to a surface-to-air missile occurred on 24 July 1965. The F-4 Phantom, part of a larger strike package, was struck by an SA-2, killing the radar intercept officer in the jet's backseat. The pilot, Captain Richard P. Keirn, ejected safely but spent the next eight years of his life as a prisoner of war. Keirn's training did not prepare him to defeat the SAM attack. He had been flying at medium altitude

[30] William W. Momyer, *Air Power in Three Wars (WWII, Korea, Vietnam)*, (Maxwell Air Force Base, Ala.: Air University Press, 2003), 133; ACC, TAC Files, Southeast Asia Review Files, "Southeast Asia Review: Final Issue," May 1974, 1-10

[31] Earl H. Tilford, *Setup: What the Air Force did in Vietnam and Why*, (Maxwell Air Force Base, Al: Air University Press, 125

when the missile was launched against his aircraft. Worse than this loss though was the response to his being shot down.[32]

The retaliatory strike occurred three days later and was a fiasco. In response to the loss of a single F-4, the Air Force launched a massive strike package of more than 100 aircraft against the surface-to-air missile sites. Expecting retaliation, the North Vietnamese had moved the surface-to-air missiles away from the target but had increased the number of small arms anti-aircraft batteries. In the ensuing strike, the Air Force lost six aircraft and all but one of their crew members.[33]

TAC immediately recognized the need to attack the surface-to-air missile sites. Destroying these sites was expected to provide greater freedom of movement to conduct other operations. TAC set about creating a program designed to train with the sole purpose of destroying SAMs. The initial name for these missions was "Iron Hand." As part of the Iron Hand construct F-100 aircraft would precede an attack and attempt to get the SAM sites to turn their radars on so they could be targeted and destroyed. These F-100s, later F-105s or F-4s called themselves "Wild Weasels." Conducted by both services, Iron Hand produced results that were less than desired. Loss of aircraft to surface-to-air missiles continued to rise, and the Iron Hand missions proved costly. What was required was a change in training back in the United States to better prepare incoming pilots for the real threats they would face. Not only were the Iron Hand missions having little to no effect, but the surface-to-air missile sites were proliferating. Between July and September 1965, the number of sites quadrupled, Although hundreds of sorties were flown against the surface-to-air missile sites, the first confirmed Iron

[32] Jacob Van Staaveren, *Gradual Failure: The Air War Over North Vietnam 1965-1966*, (Washington, D.C.: Air Force History and Museums Program, 2002), 163.
[33] It is not known whether the North Vietnamese Army moved the missiles or fired all the ones at that site in the downing of the F-4 on 24 July 1965; Jacob Van Staaveren, *Gradual Failure*, 165; Air Combat Command, Red Baron Reports, vol 1.

Hand kill did not come until the middle of October. The Iron Hand missions did not aim to destroy the SAM network in its entirety and the strikes, in general, did not have much success. Back in the United States, Tactical Air Command was taking its first tentative steps at adaptation of tactical air power.[34]

Throughout the Vietnam War, Air Force officers developed new ways of employing the aircraft they flew. Many pilots, tasked to accomplish many types of missions, could not become proficient in any of them. Aircraft designed for a singular purpose (air-to-air intercepts, nuclear delivery, or deep interdiction) and their crews performed air-to-air missions one day, only to be sent against ground targets the next. One squadron might perform an Iron Hand mission to protect a strike package and the next day be the strike package. Fighter pilots in many units became jacks of many trades and masters of none. Tactical Air Command recognized the need for pilots to specialize in one mission set, especially when a mission concerned destroying the surface-to-air missiles. After the initial Iron Hand operations had begun, TAC made a major change to training back in the U.S.

In 1969, Tactical Air Command established a concept of operations for a squadron of tactical aircraft to perform only one mission. Rather than accomplish numerous missions this squadron would only do "Wild Weasel" missions. As already noted, the tactical fighter pilots who flew Wild Weasels were trained and equipped with the specific goal of suppressing or destroying the enemy's integrated air defense systems. For the first time, the Air Force was focusing attention on the serious losses suffered to the pilot force over North Vietnam. The initial plan written in 1969 stated that "experiences from the air campaign over North Vietnam demonstrated the need for neutralization of radar-directed defenses, if freedom of aerial movement over enemy territory is to be achieved." Initially, F-100s in theater were equipped to

[34] Jacob Van Staaveren, *Gradual Failure*, 163, 192.

perform the mission, while dedicated squadron of F-105s and F-4s back in the U.S. was being activated and trained. The first squadron of Wild Weasel F-105s activated at McConnell Air Force Base was the Twenty-Third Tactical Fighter Wing. This change in training had an enormous impact on the Vietnam conflict. The F-105s and F-4s functioned as Hunter/Killer teams with the F-105s getting the SAMs to focus their radars on them allowing the F-4s to fire radar guided missiles at the SAM site. The success of the SA-2 against fighter aircraft drastically decreased after 1967 and ceased to be effective after 1969. It wasn't until the Linebacker operations when SA-2s started downing B-52s that their effectiveness increased again. However, the surface–to-air missiles were only part of the problem. Tactical pilots in Vietnam also had to contend with enemy aircraft.[35]

American fighter pilots in Vietnam did not have the proper training necessary to engage with and destroy Soviet fighter aircraft; they had never even conducted a mock engagement against an American aircraft that might simulate a Soviet aircraft in size and speed. Combat training prior to the war did not emphasize dogfighting as a necessary skill. As F-4 pilot Major Ralph Wetterhahn stated years later, "My first engagement against a dissimilar aircraft was in actual combat."[36]

The dominant producer of Soviet combat aircraft throughout the Cold War was the Mikoyan-Gurevich (MiG) design bureau. U.S. Air Force pilots encountered four primary Soviet combat aircraft the Vietnam War: the MiG-15, MiG-17, MiG-19, and MiG-21. Soviet designed aircraft were technologically equal to their American counterparts. Although it is highly likely that Soviet pilots flew combat missions in Korea and Vietnam, the U.S. airmen most often battled their pilots from China, North Korea, and North Vietnam, all of whom were trained by

[35] Air Combat Command, Tactical Air Command Histories, 1971, vol. 3, Supporting Document 247; Earl H. Tilford, *Setup*, 255
[36] Major Ralph Wetterhahn, email with author, 17 Oct 2011

the Soviet Union. The first jet aircraft to enter into service was the MiG-15, referred to by its North Atlantic Treaty Organization (NATO) call sign *Fagot*. American pilots encountered the MiG-15 for the first time in Korea. The swept-wing, small, and nimble fighter outclassed everything in the theater in 1950. The U.S. Air Force was forced to rush the deployment of F-86 *Sabre* aircraft to combat the threat. The second Soviet aircraft that American airmen encountered was the MiG-17, code-named by NATO as the *Fresco,* designed to replace the aging MiG-15. The MiG-17 was an advanced model of the MiG-15 with wings that were swept even further than its predecessors, an afterburner, and high maneuverability.[37]

The consummate fighter pilot Robin Olds described the MiG-17 in the following terms:

> That little airplane could give you a tussle the likes of which you never had before in your life. It's fast enough, it turns on a dime, it has a reasonable zoom capability, has very light wing loading. I've seen them split S from 2,000 feet. It's absolutely impossible to follow them. I've also seen an MiG-17 turn from where I had him at a disadvantage of perhaps a 30-degree angle off, about a mile and a half out, maybe two miles, trying to get a missile shot at him, and I've had them actually turn to make a head-on firing pass at me even though I was going about .9 mach at the time when I was closing on him. So their turn radius has to be seen to be believed. It's incredible![38]

The other primary Soviet aircraft in the theater was the MiG-19 *Fishbed* which was quickly followed by the MiG-21. Markedly different from its predecessors, the MiG-21 was an interceptor that more than equaled its primary adversary, the F-4 Phantom. The North Vietnamese preferred to send their MiG-17s after the F-4s and the MiG-21s after the less capable F-105s. This approach provided the North Vietnamese Air Force with certain advantages in air-

[37] ACC, TAC Files, Southeast Asia Review Files, "Southeast Asia Review: Final Issue," May 1974, 31
[38] Colonel Robin Olds, Oral History Interview, Air Force Historical Research Agency, K239.0512-160 C.I,8.

to-air combat against the American forces. For example, the heavy and slow American F-105s carried a particular electronic countermeasures pod, the QRC-160, which enabled the North Vietnamese forces to easily identify it on radar. This was a case of a perceived advantage in technology actually working against American pilots. Furthermore, the F-105s used the same call signs for each mission. Although this practice was done to ensure that other American assets knew what type of aircraft they were, it also allowed the North Vietnamese to identify the aircraft. MiG-21s scrambled upon radar contact with the F-105s, forcing the F-105s to either return home or drop their bomb load to engage the MiGs; either way, radar contact between the North Vietnamese and American aircraft ended the bombing missions. However, American innovativeness ended this practice when a tactical deception operation resulted in the downing of seven MiG-21s[39]

The Soviet and American aircraft each had pros and cons that helped or hindered them in any given engagement or dogfight and the Americans did not enjoy a technological advantage over the Soviet made aircraft. The MiGs were highly maneuverable aircraft. As mentioned, their turning radius was very small. However, such a tight turn caused the MiGs to bleed off speed and energy, two very important concepts in an air-to-air engagement. By contrast, the American fighter aircraft in Vietnam were comparatively much larger. The greater size meant larger engines, which gave the American aircraft greater thrust capability. The pros and cons of size, thrust, and maneuverability will be discussed later. The larger American aircraft, especially the F-4, could be seen many miles away due to black smoke billowing out the back end of the

[39] ACC, TAC Files, Southeast Asia Review Files, "Southeast Asia Review: Final Issue," May 1974, 30

aircraft when it did have the afterburner on. As one American pilot sarcastically stated, "If you want business, you've got to advertise."[40]

Preparing the Tactical Force for Combat

The focus on strategic bombardment and protection of bombers prior to Vietnam led to a significant loss of tactical aircraft during the war. Training prior to the conflict was done to meet the needs of the bomber force and was not focused on preparing tactical pilots to close with and engage enemy aircraft or defeat their air defenses. Major Ralph Wetterhahn flew more than 150 combat missions during Vietnam. When looking back on training that he had received prior to the war, he stated, "The bomber community had made sure all we knew were fundamental intercept techniques needed to bring down Soviet bombers."[41]

The tactical pilots were certainly capable of operating their weapons systems, but many of them did not how to make use of their full potential. As another pilot, Colonel Jim Hardenbrook, stated:

> We never had any dissimilar air combat training, never max performed the aircraft, and never had any tactical discussions before being involved against an integrated air defense system. Our aircraft, the F-4, had no gun early on, not even a pod, no defensive electronic counter measures, no chaff, and unreliable air-to-air missiles. We had no large-scale formation training for assembling and refueling and had never flown in large strike packages before. So the bottom line was we had no formalized training, no idea what to expect in combat, and we had to develop tactics as we executed our mission.[42]

[40] Major Ralph Wetterhahn, email with author, 17 Oct 2011; Gaillard R. Peck Jr., *America's Secret MiG Squadron*, 17.
[41] Major Ralph Wetterhahn, email with author, 17 Oct 2011.
[42] Colonel Jim Hardenbrook, email with author, 20 Oct 2011.

One of the most serious problems facing the pilots in North Vietnam was their complete lack of experience flying fighters. The pilots were not trained for the type of combat they actually faced during American involvement in Vietnam.

On 17 July, 1969 Chief of Staff of the Air Force Joseph McConnell directed that no pilot would do two tours in Vietnam until every pilot had accomplished one. The concept stemmed from the perception by General McConnell and other senior leaders that a pilot trained to fly one type of aircraft, a transport or refueler, could carry his training over into a different aircraft, a fighter or a bomber. General McConnell created the "universally assignable pilot" program. Pilots were funneled from their primary aircraft type, sometimes heavy bombers and tankers, into a Replacement Training Unit to learn how to fly combat fighters. The training at Replacement Training Units was done at full throttle to push pilots through the course and get them into cockpits in Vietnam. As mentioned earlier, the training time to qualify a new fighter pilot had already been cut from 26 to six weeks. Although done for practical reasons, mostly to ensure the small fighter community was not bearing the entire burden, the decision had negative consequences. Senior Air Force historian C.R. Anderegg, himself a Vietnam fighter pilot, stated that the Replacement Training Units provided a "poor learning experience that did not adequately prepare them (pilots) for the rigors of war." The transfer from one type of aircraft to another without proper training was a detriment to the pilots headed to Vietnam; both items hindered combat capability. Not only were pilots flying aircraft they were not familiar with; the quickness and lack of realistic training ensured pilots entered into combat with only rudimentary skills and not those needed to successfully employ their aircraft.[43]

[43] Air Force Historical research Agency, "USAF Personnel Rotation in Southeast Asia (A Chronolgy), April 2008, http://www.afhra.af.mil/shared/media/document/AFD-090804-098.pdf; C.R. Anderegg, *Sierra Hotel: Flying Air Force Fighters in the Decade After Vietnam* (Washington, D.C.: Air Force History and Museums Program, 2001), 17.

As an intermediate step for a pilot making the transition from a heavy aircraft to a fighter, many students transitioned first to a jet trainer. Many pilots had flown these trainers in their initial flight schools before being selected for heavy aircraft. It was during flight training in these jet trainers, T-38s and T-33s, that many pilots learned that they did not have the aptitude and inclination necessary to fly fighters. Years later, they were back in the same cockpits as an intermediate step before landing in F-100s, F-105s, and F-4s. This curious practice took a pilot in whom the Air Force had invested time and money to make proficient in one aircraft and then quickly and rushed him through a Replacement Training Unit to send him into combat in an aircraft in which he had no experience. It would be akin to taking someone in 2013 who had spent years working with the systems of Microsoft and then giving him or her a crash course in Apple products and expecting him or her to be capable of producing complex products using Apple software in a matter of weeks. Once "trained," new pilots with fewer than 100 flying hours in their new aircraft were sent to Vietnam and coded as full-up members of a combat crew.

These new pilots and the veterans who had been in the fighter community much longer were now sent over the skies of Vietnam with extremely complicated aircraft and munitions that did not always work as advertised. Wing commanders in Vietnam expressed concern over the amount of combat training arriving pilots had received. Colonel Lyle Mann stated in his end of tour report that newly assigned pilots needed "considerably more air-to-air training." Newly assigned pilots recognized their training prior to deploying had been lacking as well. In dozens of after action reviews a common theme from combat pilots was "insufficient training air combat tactics." Perhaps one un-named pilot said it best, "Training was not really adequate…I didn't

know what the heck I should do in a hassle such as this." A dual problem emerged, aircraft that were overly complicated and pilots not properly trained to employ to their full potential.[44]

Not only did American pilots lack the training necessary to conduct operations in Vietnam; their equipment, particularly their air-to-air missiles, were also lacking The U.S. Air Force mainly employed the long-range AIM-7 Sparrow missile. The AIM-7's probable kill (Pk) rate, or the likelihood that a missile would hit its target, was billed at 0.7, but analysis conducted in the later reports showed the Pk rating to be no higher than 0.08, meaning that rather than having a 70 percent chance of hitting its intended target, the missile actually had less than a 10 percent success rate. According to a RAND study conducted in 2008 enemy MiGs had been more likely to approach dogfighting proximity or "merge" with American aircraft than had been expected as the air war began. Reports about tactical engagements showed there to be more than 300 cases where enemy aircraft were close enough to enter into a dogfight. Later in the war, the AIM-9 Sidewinder emerged as a close-in missile. American Missiles were designed primarily for engaging a non-maneuvering target from behind the targets six o'clock position. This characteristic proved to be a detriment because air-to-air engagements over Vietnam were almost always high-G maneuvering fights. The mentality in training prior to the war was that the function of fighters was to protect American bombers and to shoot down Soviet bombers that were not capable of maneuvering quickly. Fighters flown by the North Vietnamese demonstrated proficiency at countering this limited missile capability. They simply stayed out of the missile's "weapons employment zone," the area where the missile stood the best chance of hitting its target. This caused the probability of a kill with the AIM-9 to fall to slightly higher than one in

[44] AFHRA, Col Lyle E. Mann, end-of-tour report, 7 November 1970-6 November 1971, 1 November 1971.15.K717.131; ACC, TAC Red Baron Report Files, Air-to-Air Encounters in Southeast Asia Vol I (herein referred to as RBR), 34, 196

ten by the end of the conflict. Concerning the missiles he employed, Major Wetterhahn stated, "The early AIM-7s and AIM-9s were designed to shoot down non-maneuvering bombers. The AIM-9B, for example, was limited to a maximum of 2 Gs at launch. If a pilot tracked a target at higher than 2 Gs, the seeker head would reach the gimbal limit after launch and lose the target." Colonel Jim Hardenbrook had even harsher words for the early missiles, saying, "If it wasn't one problem, it was multiple problems. Most of the time, the motors would not fire. If they did, the missiles would not guide, [and] if they guided, the war head would not fuse….overall the reliability of our missiles was in the 10% range, but this got better over time." Correcting these problems was addressed in the immediate aftermath of the Vietnam War. After the war, the Tactical Air Command set about ensuring their pilots were trained to put their aircraft in position to maximize the effectiveness of the missiles. [45]

Besides the limitations of the missiles, most pilots had very little formal training in actually firing live missiles. The Air Force's air-to-air school, the Weapons System Evaluation Program, where pilots had the opportunity to fire live missiles, was in its infancy. Between inferior training, inferior experience, and inferior technology, it is little wonder that the Pk rates were so low. Colonel Pete Marty, a TAC Weapons System Operator (WSO) who flew combat missions in the rear seat of the F-4, stated,

> Most missiles were fired outside their intended envelope or at the edges where performance would be low. Pilots entering into combat needed better preparation. No ground troop would be allowed to enter battle without first firing his weapon and yet, that is exactly what was happening to Air Force pilots in Vietnam. Add to that the fact that

[45] John Stillion and John Perdue, "Air Combat Past, Present, Future," RAND report for Project Air Force, August 2008, http://www.defenseindustrydaily.com/files/2008_RAND_Pacific_View_Air_Combat_Briefing.pdf; Major Wetterhahn, email with author, 17 Oct 2011; Colonel Jim Hardenbrook, email with author, 20 Oct 2011; Air Combat Command, Tactical Air Command Histories, RBR, vol. 3, 5

there was little live testing of aircraft missile interface, and many missiles would leave the rail dumb.

Had pilots had more training prior to deployment in how to optimize thie use of their aircraft and weapons systems the Pk rates may have been higher. Some Korean and World War II veterans who were still flying in Vietnam personally inspected each missile and picked specific ones to go on their aircraft. Colonel Robin Olds was known to reject missiles he did not believe would be effective. Still, the vast majority of pilots did not understand how the missile system worked, another problem of the universally assignable pilot program and pilots having so little fighter experience. After the war, teaching pilots basic "switchology," the basic steps needed to correctly fire a missile, was one of the earliest steps taken to improve air-to-air readiness. To counter these technological problems, the fighter pilots in the Vietnam Theater often came up with various ruses to fool the enemy into accepting a disadvantageous combat situation.[46]

The subpar training that pilots received prior to their arrival in Vietnam was a leading contributor to aircraft losses. The pilots simply were not prepared to engage an enemy in combat. Even worse, many pilots entering Vietnam in fighter aircraft were not trained to use, nor did they understand basic fighter maneuvering concepts. It was all of these problems that Air Force pilots set about correcting after the war in a single exercise to prepare the next generation for combat. As one pilot stated, "…not only did I not know how to do basic air combat maneuvers, I did not know they even existed. Terms like 'barrel roll attack,' 'vertical climbing scissors,' and 'high speed yo-yo,' were not even in my vernacular." With these training limits imposed and new pilots arriving in the theater having had little time in the aircraft, it fell to local squadron and wing leaders to fix some of the problems. To counter the threats of anti-aircraft artillery, surface-to-air missiles, or MiGs in theater, commanders developed new tactics.

[46] Colonel Pete Marty, email with author, 17 Oct 2011.

As close air support flyer Jon Goldenbaum put it, "In combat there is no time for the classic feedback loop, no slick 3-1 manual changes, no patch-wearer preaching the doctrine du jour. You simply changed and changed fast. Nobody back at the schoolhouses had any idea what was happening real time. Thus, new arrivals were totally unprepared." [47]

Another problem faced by tactical air crews in Vietnam was the way in which deployments were filled. One change in the post-Vietnam War military structure was that unit deployments became the norm; prior to this change personnel were deployed as individuals or in small groups. During the conflict in Vietnam, rather than deploy entire squadrons from the continental United States, units were permanently assigned to bases in the area of operations, and pilots were rotated in and out on one-year assignments in what was called the "pipeline system." The U.S. Army had a similar replacement system during the Vietnam War. Pilots did not deploy with their home unit, and they did not deploy with the men with whom they had trained. It was a rare occurrence for a stateside wing to deploy en masse. In the few instances when this did occur, such as the Forty-Ninth Tactical Fighter Wing deployment to Takhli Royal Thai Air Base in 1972 and later the 366th Tactical Fighter Wing deployment, also to Takhli, combat losses drastically decreased among these units, although the decrease in aircraft losses may also have been due to the time when the aircraft deployed. Unit level deployments were emphasized in post-war training exercises.[48]

These two deployments were the result of the Rivet Haste program, which introduced the new modifications in the F-4E and a core of hand-picked pilots trained to deploy as a whole.

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[47] Major Ralph Wetterhahn, email with author, 17 Oct 2011; For an in-depth look at fighter tactics see: Robert L. Shaw, *Fighter Combat: Tactics and Maneuver* (Annapolis, Md.: Naval Institute Press, 1985); Jon Goldenbaum, email with author, 17 Oct 2011. A 3-1 manual is an individual aircraft's "Tactics, Techniques, and Procedures Manual." A "patch wearer" is a graduate of the Air Force's Fighter Weapons School.

[48] Air Combat Command, Tactical Air Command Histories, 1973, vol. I, 243-246.

According to the official TAC history from 1973, the purpose of Rivet Haste was to provide the pilots with the "most advanced aerial combat knowledge and techniques available." Advancements in the F-4E included the introduction of "Hands On Throttle And Stick" (HOTAS), which allowed pilots to cycle through and select their weapons without having to remove their hands from the throttle, and the "Target Identification System Electro-Optical" (TISEO), which allowed for target identification beyond the visual range of the pilots ocular ability. The Rivet Haste program had little effect, though, because it appeared so late in the war; the units did not deploy until 1972. After the Vietnam War, squadron-sized deployments became the norm. During Desert Storm, entire wings composed of multiple squadrons deployed together. When it deployed in 1972 the Forty-Ninth Fighter Wing deployed, it conducted combat operations for nine months and did not lose a single crew to enemy fire. After the war, during the training revolution that occurred, units deployed to exercises together, just as they would be sent into combat operations -- as a cohesive unit.[49]

To overcome the lack of training and the problematic equipment in-theater commanders made changes to tactics on their own. In particular, Colonel Robin Olds pushed his new pilots hard. Speaking on the lack of training that he had to overcome, Olds later said "even after coming home from a long mission if we have enough fuel to burn to afford five to ten minutes of practice tactics. We always do it. I never let them rest. We don't want to waste a moment in the air." Olds used these last minutes of returning flights to practice formation tactics, breaking away from a surface-to-air missile, air-to-air combat tactics and maneuvering, and rolling in on

[49] Colonel Pete Marty, email with author, 17 Oct 2011; Air Combat Command, Tactical Air Command Files, 1973, vol. 1, 227; C.R. Anderegg, *Sierra Hotel*, 34,35; Gaillard R. Peck, *America's Secret MiGs*, 40, 41; Air Combat Command, Tactical Air Command Histories, 1973, vol. I, 243-246.

targets. Even the most mundane operations, such as simply taking off with a full combat load, had never been taught back in the United States. [50]

Robin Olds' legendary status is well-deserved, and his use of the most able and qualified pilots as flight leads, rather than the pilots who had the highest rank, would be echoed in the changes that occurred within the USAF tactical forces throughout the 1970s and 1980s. Olds, while wing commander of the 8th Tactical Fighter Wing, also began scheduling dissimilar aerial dogfights with local Australian F-86 pilots who were also stationed at Ubon, Royal Thai Air Force Base. These training dogfights exposed Olds' pilots to an aircraft similar to the MiGs they faced in combat. It was an in-theater fix to training problem back in the U.S. and it was very successful. The changes to training and combat missions that Olds instituted with the 8th TFW became standard practice during the training changes that occurred after the war; these changes also had direct results during the Vietnam conflict.[51]

In perhaps the most famous Air Force tactical combat operation of the Vietnam War, Colonel Robin Olds deceived North Vietnamese MiG-21s into launching against his F-4s masquerading as slower and more vulnerable F-105s. Olds' in-theater adaptation showed exactly the kind of innovative thinking that was not occurring at the Fighter Weapons School or at other training facilities back in the U.S. It was exactly the kind of innovative thinking that was not occurring at the Tactical Air Command at the time. Contrary to oral tradition and fighter pilot barroom tales that Olds was a maverick with no use for authority, Olds went to Seventh Air Force Commander General William Momyer and asked permission to attempt to destroy the MiG-21s. General Momyer concurred with the plan; Olds named the operation "Bolo" after a

[50] Colonel Robin Olds, Oral History Interview, Air Force Historical Research Agency, 12 July 1967; K239.0512-160 C.I, 6
[51] Colonel Robin Olds, Oral History Interview, Air Force Historical Research Agency, 12 July 1967; K239.0512-160 C.I, 6, 42-44

fighting knife. Of course, Olds and Momyer both knew that the easiest way to destroy the MiG-21s would be an attack on the bases where the aircraft were stationed. Doing so would have destroyed the MiGs on the ground, or at least forced the MiGs to operate from locations farther away. Rules of engagement established in Washington, once again, precluded making attacks against forces on the ground until later in the war.[52]

Olds knew that his enemy was a living, thinking organism capable of analysis and adaptation. It was common at this time for Air Force fighters or fighter bombers to use the same call signs on missions to avoid confusion with each other. As an example, the F-105 bombers often used vehicle names, such as Ford, Chevy, and Oldsmobile, and this was often a clue to the North Vietnamese that the slow and heavy "Thuds" were approaching. For Bolo, the F-4s used these same call signs. In the final part of the ruse, Olds had his F-4s equipped with the QRC-160 jamming pods that, until then, only the F-105s had used. Thanks to a New Year's ceasefire, Olds had enough time to retrofit his F-4s with the jamming pods. Starting on 1 January 1967 maintenance crews uploaded the QRC-160 electronic countermeasures pods in secrecy. Subsequently, each aircraft was uploaded with a full complement of AIM-7 Sparrow and AIM-9 Sidewinder air-to-air missiles.[53]

On 2 January 1967, a mammoth package of aircraft lifted into the sky from Ubon and Da Nang. Olds had ensured that the phantom package mirrored a large F-105 strike in every way by including support aircraft. Olds had his F-4s spread apart at five-minute intervals, hoping to ensure that once the MiGs were engaged they would not be able to escape. The heavy cloud cover both helped and hindered the operation. On one hand, the MiGs didn't know a trap had

[52] Wayne Thompson, *To Hanoi and Back: The U.S. Air Force and North Vietnam, 1966-1973* (Washington, D.C.: Air Force History and Museums Program, 2000), 52-55; Colonel Robin Olds, Oral History Interview, Air Force Historical Research Agency, 12 July 1967; K239.0512-160 C.I, 14-15.
[53] Air Force Historical Research Agency, Eighth Wing History, 1967.

been set until they burst through the cloud cover and right into the waiting F-4s. On the other hand, the MiGs were able to use the cloud cover to escape before the second wave of fighters entered the fray. As many as twelve MiG-21s came up to engage Olds' men that morning. Olds' crews shot down seven of the aircraft. The lost aircraft represented between one-third and one-half of the total MiG-21 aircraft operating in North Vietnam at the time. For the rest of the war, the North Vietnamese never sent that many MiG-21s skyward at the same time again. Olds and his crews quickly became known as "the leading MiG parts distributor in Asia." Olds' Bolo operation worked as he had planned it. Still, a combat zone was not the preferred location to make changes to training and operations. Olds believed that combat was the only location where a fighter pilot could truly learn his trade. When Olds returned from Vietnam he was interviewed by the Air Force's Historical Research Center. During this interview, conducted in 1967, he stated "you can't train a man in the United States to do what he's going to have to do in combat. It's difficult to simulate air-to-air combat. Olds retired from the USAF in 1973 just as changes he had made a wing commander were being implemented on a larger scale throughout the Tactical Air Command.[54]

Reports on Tactical Problems

Concrete changes to training back in the United States began to occur during the Vietnam conflict but they were slow in coming. The fighter communities in both the U.S. Navy and Air Force were fairly quick to recognize that the loss of tactical aircraft was a serious problem, even if both were slow to implement the fundamental changes necessary to fix it. Two USAF reports helped TAC helped general officers and the combat fighter pilots see the need for changes in vision and in training that allowed for a more integrated understanding of air power

[54] Wayne Thompson, *To Hanoi and Back*, 52-55; Colonel Robin Olds, Oral History Interview, Air Force Historical Research Agency, 12 July 1967, K239.0512-160 C.I, 14-15.

than had previously prevailed. As early as 1965, Tactical Air Command deployed a special team to Vietnam to examine the problem of aircraft losses and propose changes. A few years later, the U.S. Air Force formed a special committee to examine not just aircraft losses in general terms, but also every single air-to-air engagement of the war. These two reports were the impetus behind the training revolution that occurred after the war.

The Graham Report

Early in 1965, the Tactical Air Command's director of operations, Major General Gordon M. Graham, a veteran of World War II and a rare triple ace, led a team to South Vietnam in order to "determine why jet losses occurred in a relatively unsophisticated environment." The resultant report presented to the Air Force headquarters staff in April 1965, which became known as "The Graham Report," detailed multiple reasons why the Air Force had lost its jet aircraft due to ground fire. The methodology used in the report included interviewing participants in missions and their commanders and observing the pre and post mission briefings. With remarkable clarity, the report succinctly demonstrated the root causes of aircraft loss during the Vietnam War. Although various factors contributed to the losses—including a failure of the main element; reconnaissance and pathfinder and support elements or their commanders not briefing together; and a failure to vary route and entry procedures to the target, which effectively eliminated any element of surprise—the largest contributing factor to aircraft losses early in Vietnam was poor tactics.

In detailing the losses, the Graham Report established that "tactics used were akin to gunnery range technique," and "tactics, weapon delivery and plain judgment caused the loss of two aircraft." The fix to this problem seemed relatively simple: "It is entirely possible that the flak suppression AC (aircraft) which were lost would not have been lost [had] different tactics

based upon sound target analysis and flak analysis been employed." One of the primary conclusions of the Graham Report was that tactical training stateside must undergo major revisions. The report suggested "revisions to the tactical training program. Realistic training with typical combat maneuvers and live ordnance configurations must be injected. Our pilots must progress beyond gunnery school patterns before they go into combat." This particular conclusion is interesting not only because of its suggestion for more realistic training, but because it recognized that the training that pilots were then taking at training centers back in the U.S. was inadequate. The report clearly indicated that the training fighter pilots received prior to deployment was not enough but chose to recommend that the problem should be fixed in Vietnam and not back in the U.S.[55]

The Graham report noted that aircraft were being lost in Vietnam for many reasons. First, aircraft entered SAM threat areas at altitudes that were optimized for the SAM to be fired at the approaching aircraft. Second, fighter aircraft on bombing missions were not evading AAA fire. Rather, they performed "orthodox" maneuvers that made them vulnerable to ground fire. Third, rarely was any attempt at reconnaissance accomplished prior to a mission and attacking pilots had to send their own aircraft ahead to "hunt" for AAA.[56]

The most troubling aspect of the Graham Report was that Tactical Air Command recognized that aircraft losses were increasing, but chose to view "jet losses in SEA (Southeast Asia)…" as having "…no meaningful relationship to an expanded war." TAC's view, at least as far as indicated in the Graham Report, was that current methods of training in the U.S. should not be immediately changed. The TAC history from 1965 noted that the USAF needed to focus on "proved [sic] capabilities" instead of creating new ones. The Graham Report's conclusion passed

[55] Air Combat Command, Tactical Air Command History, 1965, vol. 4.
[56] ACC, TAC History, 1965, Supporting Document 286, Graham Report, 1-9

the requirements to stem aircraft losses to in theater commanders. The wing commanders in the area of operations had authority to changes. Despite all of the shortcomings detailed in the report, in April 1965, at least where the authors of the Graham Report were concerned, the problem of aircraft losses was not a cause for immediate change to training programs in the U.S. Although the Graham Report recommended that the fix to stemming aircraft losses was an in-theater concern and not one requiring change to current training procedures. Senior leaders of the Tactical Air Command did not agree. [57]

General Sweeney forwarded to Vice Chief of Staff General William Blanchard more than twenty letters from other members of his staff at TAC requesting changes to training directly. No response from Blanchard was forthcoming. Less than a year later, General Blanchard died in his office of a massive heart attack. He was replaced by General Bruce Holloway, a man who had his own perceptions about how the air war in Vietnam was going.

In Vietnam, many fighter pilots shared General Sweeney's discontent with the findings in the Graham Report. The director of operations for the Second Air Division, Lieutenant Colonel Gary Sumner, was severe in his critiques. Sumner called current training methods completely unrealistic. He believed that training back in the U.S. should have resembled what men were facing in Vietnam to include "camouflaged and realistic targets: vehicles, bridges, [and] gun emplacements." Sumner also believed that aircraft should be configured for training missions just as they would be in Vietnam, and that aircraft needed to be outfitted with a full conventional load. A runway in South Vietnam was not the ideal location for a new pilot to attempt his first takeoff with a fully loaded aircraft. Lieutenant Colonel Sumner stated that having firmly predetermined routes in training missions was unrealistic because in combat the ingress routes might have to change due to enemy fire. Sumner's final recommendation was that when tactical

[57] Ibid

aircraft were on a bombing mission they needed to attack low and fast, and only at the last minute should they "pop up" to strike the target. Coming in at training altitudes guaranteed getting surface-to-air missiles shot at you, which Sumner believed was quite unnecessary. This was echoed in the Graham report but the report wanted in-theater commanders to make the change rather than teaching pilots in training the correct way.[58]

Opinions of others in the Second Air Division indicated that another area needing improvement was air-to-air tactics. Tactical Air Command required only three air-to-air sorties every four months to be qualified to conduct combat missions. Second Air Division officers said that this number had to increase drastically and also called on Tactical Air Command to find dissimilar aircraft to train against. A pilot going into battle in Vietnam needed to be exposed to a small, fast, and nimble fighter that was different from American aircraft, and the air over Vietnam was not the best place for a first encounter. As early as 1965, Tactical Air Command identified the root problems that were reducing pilot proficiency, but it would be several more years before concrete changes occurred. The Graham Report was the first project that studied the loss of aircraft in Vietnam and was one of the first assessments that led to concrete change in the tactical forces after the war. However, it was a different report that took shape in 1969 that had the most impact on training and tactical changes after the war.[59]

Project Red Baron

At the request of the Air Force's director of defense research and engineering, the Weapons Systems Evaluation Group began a study of every air-to-air encounter in Southeast Asia. The project code name was Red Baron. The findings of Red Baron reports detailed the problems faced by U.S. fighter pilots during the Vietnam War that needed to be fixed. The

[58] Air Combat Command, Tactical Air Command Histories, 1965, vol. 1, 803; ACC, TAC History, 1965, Supporting Document 286, Graham Report, 1-3
[59] Ibid

major problems included the difficulty in locating the enemy in the air before he had the ability to move into an advantageous firing position, the need for an all-weather air superiority fighter, and, most importantly, the need for realistic training to properly prepare fighter pilots for combat.[60]

In 1969, General Momyer, who by that time had become commander of Tactical Air Command, used the Project Red Baron reports to evaluate the effectiveness of TAC air crews in air-to-air engagements in the skies over Vietnam. Written in three volumes over several years, the reports covered each engagement chronologically. Furthermore, the Air Force did not limit itself to evaluating only its own engagements; it also dissected Navy operations as well. Volume I covered F-4 and F-8 engagements prior to March 1967, volume II covered the F-105 engagements in the same period, and volume III covered the very narrow period of March 1967 to August 1967; Volume III did not cover a particular aircraft. In total, the Red Baron project officers covered 320 engagements and conducted more than 150 interviews of mission participants.[61]

Much like that in the Graham Report, the data used in the Red Baron project came from after-action mission reports and interviews with the air crew, when possible, for each engagement. The data collection for Red Baron was exhaustive. Beyond mission reports and interviews, the project's members combed through records belonging to the Chief of Naval Operations, the Chief of Staff of the Air Force, Commander in Chief of the Pacific Fleet, Commander of the Pacific Air Forces, and Commander of the Seventh Air Force. Researchers used, when available, video-taped footage from gun cameras, letters from participants, and in-

[60] The Weapons System Evaluation Group leads the USAF's Weapons System Evaluation Program (WSEP). The group is responsible for the live-firing of air-to-air and air-to-ground munitions: Combat Archer and Combat Hammer respectively; Air Combat Command, Tactical Air Command Histories, Red Baron Reports, vols. 1-3

[61] Air Combat Command, Tactical Air Command Histories, Red Baron Reports, vols. 1-3

flight communication tapes—anything that helped them to recreate the engagements. The intent of the massive data collection effort was to obtain sufficient data to reconstruct the various air-to-air encounters in as much detail and with as much accuracy as possible. While some interviews lasted only a few minutes, many lasted several hours as the pilots and interviewers struggled to piece together a particularly chaotic dogfight. [62]

Psychologists also aided in the interviews primarily to help alleviate the difficulty pilots had in piecing the encounters together minute by minute. Those who suffer from extreme stress during a traumatic event, such as a car accident or a dogfight, often suffer some type of temporal distortion. In retrospect, for the pilots, events that occurred in a few seconds seemed to drag on for an indeterminable time, and unimportant aspects seemed to occur instantaneously. It became clear during the course of the interviews that the air-to-air combatant rarely had an accurate sense of time during the event in question. Amazingly enough, pilots were able to recall a battle down to the second and in very minute detail, such as where their hands were positioned or the nose angle of the aircraft. The psychologists, from the Institute for Defense Analyses, helped piece all of this together.[63]

The Red Baron reports are essentially oral histories by those who participated in air-to-air combat in Vietnam. Volume I alone covers 248 separate encounters, 164 air-to-air engagements, and 331 interviews. The remaining volumes are similarly bulky. For each engagement, the report presented a narrative and in many cases a visual diagram to aid in the understanding of the "sufficient complexity" of the engagement. During Vietnam, military aircraft did not carry, nor did there exist, computers capable of automatically tracking known flight paths and locations of

[62] Air Combat Command, Tactical Air Command Histories, Red Baron Reports, vol. 3, 5.
[63] Air Combat Command, Tactical Air Command Histories, Red Baron Reports, vol. 1, 10, 13.

aircraft in time and space during aerial combat. Thus, the oral record of events in the Red Baron reports gives us the best idea of aerial combat during Vietnam.[64]

The first engagement recorded in Volume 1 of the Red Baron reports detailed how four F-8s (Blue 1-4) were engaged by three MiG-17s in April 1965. Blue 1 was orbiting over the target at about 8,000 feet when he was hit by what he presumed to be ground fire. The pilot was concentrating on looking for anti-aircraft weapons and was not maintaining a lookout for enemy fighters, which were the responsibility of his combat air patrol of F-4s at 25,000 feet. As soon his aircraft was hit, the pilot climbed to 18,000 feet in an attempt to escape the perceived ground fire. After considerable maneuvering, Blue 1 noticed the attacking MiGs, which departed the area due to the heavy number of incoming American aircraft that were part of a separate strike package. Blue 4 attempted to engage the fleeing MiGs but withheld fire despite a missile lock for fear of inadvertently hitting another American aircraft. The first dogfight in Vietnam ended in a draw. The American aircraft did not recognize that an attack had occurred until the enemy had departed the area. In what would be repeated in many other Red Baron reports, the American pilots did not know they were under attack until the enemy had already fired at them.[65]

Two days later, the air battle resumed with the first losses for both sides when one F-4 and one MiG-17 were shot down. The air battles increased in duration and intensity over the next several months with neither side developing any decided advantage over the other. On 17 June 1965, the Air Force scored two kills in an engagement between two F-4s and four MiG-17s, which was the first time the Air Force claimed kills without also suffering losses. Many of the aerial engagements were "sightings only" or ended with no damage or loss of aircraft to either side. In fact, between the first battle in April 1965 and June 1966, the Air Force lost only one

[64] Air Combat Command, Tactical Air Command Histories, Red Baron Reports, vol. 1, 15.
[65] Air Combat Command, Tactical Air Command Histories, Red Baron Reports, vol. 1.

aircraft to an enemy MiG. After that, however, the Air Force experienced an increasing loss rate, losing seven aircraft to MiGs over the next seven months but killing seventeen in return. Of those seventeen, seven were killed in one engagement during Bolo. Although the Air Force maintained a superior kill rate to the MiGs, it never approached air superiority over Vietnam and for the better part of a decade Air Force pilots engaged in aerial warfare that they had not been properly trained to conduct.[66]

The Red Baron reports demonstrated that there were a few universal truths about air combat in Vietnam. The first was that the majority of American pilots who were shot down did not know enemy aircraft were in the vicinity until it was too late. The MiG-15s, 17s, and 21s were smaller, faster, and generally more maneuverable than their larger American counterparts. Furthermore, the MiGs were notoriously hard to spot unless they were giving off contrails. Finally, the enemy's preferred method of attack with MiGs' was high and fast from the rear. Olds spoke about this tactic after his return home:

> Going in a pair of MiG-21s hit us, two of them, and they came in supersonic from six o'clock high and was [sic] right on top of us before we ever knew anything about it, launched a bunch of missiles, and shot down two of my F-4s. Bang. Just that fast. I turned around, I heard them scream, I turned, and all I saw were two burning objects on the side….these MiGs were gone, supersonic.[67]

There is an old adage among fighter pilots that says "lose sight, lose the fight." In the case of many engagements in Vietnam, American pilots never had sight in the first place. Finding a way

[66] Air Combat Command, Tactical Air Command Histories, Red Baron Reports; The Red Baron Reports account only for air-to-air losses and not anti-aircraft artillery or surface-to-air missile losses, which were much higher, as discussed.
[67] Air Combat Command, Tactical Air Command Histories, Red Baron Reports; Colonel Robin Olds, Oral History Interview, Air Force Historical Research Agency, 01 January 1968, K239.0512-051, 40.

to locate and fix enemy aircraft became a major goal when changes were made in training after the war ended.

The second lesson learned from Red Baron was that American pilots, even if they could locate and engage an enemy MiG, had very poor air-to-air training. American fighter pilots in Vietnam did not have sufficient skill to dogfight the enemy. This was repeated by the interviewed pilots throughout the Red Baron Reports. In Volume I pilots stated they had "received insufficient training in air combat tactics," and "safety restrictions severely limited air combat tactics training prior to deployment."[68]

The final finding from Red Baron was that pilots were so task-saturated in learning how to employ air-to-air weapons for one mission, air-to-ground munitions for the next mission, or electronic jammer operation for yet another mission that they never had the chance to become proficient in any of these tasks. This reality was also discovered by the U.S. Navy in the "Report of the Air-to-Air Missile System Capability Review", more commonly called the Ault Reports. The Ault Reports, conducted in the latter half of 1968, demonstrated to the Navy that their fighter pilots were not trained to place their aircraft in an advantageous position to use missiles against enemy MiGs. The Navy set about to fix this problem in 1969 with the creation of the Fighter Weapons School, more commonly known as Top Gun to the American public, at least after release of the 1986 movie. However, the U.S. Air Force already had a weapons school, which raises the question of what, if anything, was being taught and learned at the weapons school during Vietnam? This question will be explored in a later chapter.[69]

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[68] Air Combat Command, Tactical Air Command Histories, Red Baron Reports, Vol. I, 44, 134

[69] Air Combat Command, Tactical Air Command Histories, Red Baron Reports; Naval History and Heritage Command, Naval Aviation History Office, Research and Collections, Ault Report, http://www.history.navy.mil/branches/org4-25.htm

The failures in air combat were not always linked to weaknesses in the training of American pilots or to any special successes of the MiGs. The Red Baron reports backed up what tactical fighter pilots were already saying that the missiles did not work as billed. In one scenario, as described in the Red Baron reports, two F-4s fired a total of six missiles between them. In three of them, the motors did not engage, causing the missiles to plummet uselessly to earth, and two did not track the enemy aircraft, causing them to arch, again uselessly, into the distance until their fuel ran out. The single missile that did track its target was evaded. The report did not contain the pilots' reactions to the complete failure of their missiles. Even though missile developers (Raytheon, BAE, Douglass Aircraft Corporation, and Ford aerospace) promised certain kill rates, the missiles consistently failed to deliver the promised results, due in large part to the Americans rarely being in the position to fire from directly behind the enemy. The missiles had been tested to be fired from the six o'clock position against non-maneuvering bombers, and enemy MiGs learned quickly, out of necessity, to avoid letting American pilots get into this position. Besides, once merged, fighters were often too close to effectively employ missiles. It did not help combat pilots engaged in fighting the enemy at close range that initial designs of the F-4 did not include a gun, because aircraft designers and the military establishment believed that a gun would not be needed thanks to the advent of missiles. Later versions of the Air Force's F-4 included a gun.[70]

There are several reasons for the low Pk rates the missiles achieved. First, as already suggested, many missile motors failed to fire, and the missiles fell uselessly to the ground.

[70] Red Baron Reports, vol. 1, 36; Robin Higham and Carol Williams, *Flying Combat Aircraft of USAAF-USAF (Vol.2)*. Manhattan, Kansas: Sunflower University Press, 1978, 116-119; The F-4E was the first F-4 built with an internal 20MM cannon. Earlier F-4s that did not contain the cannon placed external gun pods on the underside of the aircraft but this did little to help because it was not controlled with a computer that linked into the pilot's heads up display. Since the addition of the internal cannon to the F-4E every air-to-air fighter into the 21st century has included an internal cannon.

Second, the missiles' extreme acceleration away from the aircraft sometimes caused a guidance fin to separate from the missiles, causing the weapons to hurtle away from the targets. Third, some missiles were fired outside the weapons parameters, as was the case with the AIM-9B, which could not be fired in a turn over two Gs. Fourth, in some cases the missiles failed to track the targets due to either internal failures or countermeasures applied by the enemy, including turning into or away from the missiles. Fifth, in the enormously complicated process of "switchology" necessary to properly fire a missile, some pilots missed a step, causing the missile to hang on the rails. As one fighter pilot humorously noted, "They're called missiles and not hittles for a reason."[71]

Beyond missile failure, the Air Force also noted a need to develop and exploit "all weather, night and adverse weather conventional weapons delivery…." As it turned out, the weather in North Vietnam often precluded the Air Force from flying scheduled sorties. When the pilots took to the skies on clear days, so did the MiGs and surface-to-air missiles. By 1974, the Air Force's chief of staff, General George S. Brown, and Tactical Air Command Commander Robert J. Dixon recognized the need to be able to conduct air operations in all weather. [72]

Despite analysis found in both the Graham and Red Baron reports, the Air Force as an organization refused to accept that tactical losses were an area of concern. Some Air Force leaders refused to admit a problem existed at all. In 1968, Air Force Vice Chief of Staff General Bruce Holloway wrote an article for the *Air University Review* in which he stated that, "in South Vietnam, our air superiority came by default. In North Vietnam it has yet to be seriously challenged." This view, even through the lens of 1960s air power, was egregiously wrong. The U.S. military never held air superiority over North Vietnam because it never held, in General

[71] Lieutenant Colonel Steven Ankerstar, interview with author, 15 December 2011.
[72] Air Combat Command History Office, Tactical Air Command History 1965, vol. 1, 75.

Holloway's own words, "the degree of dominance in the air battle of one force over another which permits the conduct of operations by the former…without *prohibitive interference*." General Holloway claimed air dominance in terms that were simply not true. The North Vietnamese routinely made it a point of prohibiting U.S. Air Force assets from accomplishing their mission as opposed to Spring 1945 when the Luftwaffe was all but destroyed and Allied pilots enjoyed working in a rather permissive environment. Enemy surface-to-air missiles, enemy aircraft, and enemy anti-aircraft artillery continuously posed a threat to American air operations over Vietnam.[73]

Holloway admitted in his article that "our tactical fighters were designed primarily for nuclear war where penetration was more important than maneuverability, ordnance load carrying ability [was] more important than armament, [and] alert status [was] more important than sustained sortie rates. The tactical fighter became less and less an air superiority system…." Holloway's inability to admit that this thinking had proved costly to the ongoing war in Vietnam proves just how deeply ingrained the Strategic Air Command's mentality pervaded Air Force leaders. Holloway argued for the creation of a new Air Force fighter, then being called the F-X and later the F-15. However, it is difficult to believe the sincerity of Holloway's desire for an air superiority fighter. As will be shown in later chapters, no sooner had the F-15 been placed into full-scale production than the Air Force began exploring options to outfit it to deliver tactical nuclear weapons. After 1968, many Air Force leaders still believed the traditional understanding that air power was, first and foremost, a force that was best used to attack strategic targets. Anything suggesting otherwise was an anathema. The Graham and Red Baron reports were the

[73] Bruce K. Holloway, "Air Superiority in Tactical Air Warfare," *Air University Review*, March-April 1968.

impetus within TAC that allowed for change after war. This change allowed for terms like strategic and tactical to gradually fall away.[74]

Strategic Bombers in Vietnam

Although Strategic Air Command commanders were loath to admit it, the lines between what was strategic and what was tactical blurred considerably through the course of Vietnam. Fighter aircraft commonly bombed targets of strategic importance. For use of strategic-level assets in a more tactical role, one need look no further than the Battle of Khe Sanh, where B-52s routinely served the tactical task of close air support. Although tactical fighters provided more coverage in the defense of the Marine garrison, the use of the traditionally strategic bombers in a purely tactical role showed that the heavy bombers could provide effective tactical support in the right environment. Vietnam demonstrated that the sharp division of roles between the two primary aircraft types, fighters and bombers, no longer applied. As previously stated, fighters had long been in the business of delivering nuclear weapons. For years TAC mirrored their command's doctrine and operations on SAC's. As historian Conrad Crane cleverly stated in *American Airpower Strategy in Korea, 1950-1953*, " (General Otto) Weyland and his [Tactical Air Command] successors struck a Faustian bargain with the atomic Mephistopheles, transforming the organization into a 'junior [Strategic Air Command]' concentrating on the delivery of small nuclear weapons." Strategic Air Command, but the use of heavy bombers in close air support roles was an unexpected concept and not something Strategic Air Command wanted to embrace as a core mission. Strategic Air Command's leaders much preferred to use the B-52s in the more traditional role of strategic bomber during the Linebacker operations and it

[74] Bruce K. Holloway, "USAF Air Superiority in Tactical Air Warfare," *Air University Review*, XIX, no. 3 (1968): 2-15, http://www.airpower.au.af.mil/airchronicles/AURIndex.html#H

was completely rational on their part to want a tactical aircraft to handle air support at a much lower altitude and in closer proximity to the troops on the ground requesting close support.[75]

Operations Linebacker I and II, beginning in May 1972 and December 1972, respectively, were the last instances in which the massing of bombers together to strike targets was considered an acceptable use of American air power. Strategic Air Command's influence waned greatly after Vietnam. Technological shifts, especially the development of improved surface-to-air missiles, which took place during and after Vietnam rendered the bombers almost obsolete excluding their use during a nuclear war. During Linebacker II, the Air Force lost fifteen B-52s in eleven days, more than half of a squadron. Had the B-52s continued the Linebacker II operation much longer, the loss of aircraft would become untenable. The problem with B-52 losses was one of training and tactics. Even when conducting radar jamming, B-52s still flew at medium to high altitudes and in straight lines in a three ship formation making them prime targets for SAMs. The loss of B-52s may have been worse as there was a very good chance North Vietnam was running short of missiles. It was finally becoming clear to some junior officers that the bomber was not always going to get through. This was reinforced by SAC B-52 crews. As Historian Wayne Thompson indicated in *To Hanoi and Back ,* "From the point of view of the B–52 crews, General Meyer (SAC Commander) was simply too far away in Omaha to confront the reality of their situation adequately." However, SAC did not make a post-war change in tactics or doctrine and bomber crews that participated in TAC led exercises initially suffered worse loss rates than the combat missions during Linebacker II.[76]

Tactical aircraft also suffered heavily during the Linebacker operations. In the one-year period between April 1972 and May 1973, a total of 146 aircraft were lost to the combination of

[75] Conrad C. Crane, *American Air Power Strategy in Korea 1950-1953*, 172.

[76] Richard G. Davis, "Decisive Force: Strategic Bombing in the Gulf War," Air Force History and Museums Program, 1996; Wayne Thompson, *To Hanoi and Back*, 271

surface-to-air missiles, anti-aircraft fire, and MiGs. Nearly half of these were fighters; the loss figures did not include damaged aircraft. Often, pilots of aircraft receiving small arms fire made no mention of it, and, in some cases, damage was not discovered until a maintenance exam of the aircraft. Discovery of damage by the maintenance personnel did not always lead to a report, adding to uncertainty about how many aircraft were damaged rather than lost. In a ninety-two-day period between May and August 1972, eighteen F-4s and F-105s were lost to MiGs alone. In the single month of May, thirty aircraft were lost including the above-mentioned fighters. Tactics and training did not keep pace with the ever-thickening web of air defense systems in Southeast Asia.[77]

Accepting Blame

Some Air Force leaders were learning from aircraft losses during the war. However, others including Generals McConnell, Blanchard, and Holloway refused to accept the fact that their pilots were not properly trained for combat. In a service only two and a half decades old, the admission of tactical or doctrinal deficiencies was perceived by officers on the Air Staff at the Pentagon, many of whom were bomber pilots, as admitting overall service inadequacy or, as air power historian Donald J. Mrozek said, "Part of the problem was the implicit logic that, since what was done in Vietnam did not promptly conform to precepts of air power and since it failed to achieve the final U.S. objectives, then adoption of those precepts would have worked." Blaming operational commanders or strategic policy makers served to protect preconceived notions about air power, rather than turning an eye towards internal problems of training and deficiencies in tactics. For the service as a whole, then, problems were not admitted and "owned"

[77] Air Combat Command, SEA Files, Air Operations Report 73/3.

but passed on to those who, by not applying supposedly "proper" air power doctrine, were taken to have caused the losses of aircraft and men.[78]

The Air Force also consoled itself on aircraft losses by comparing loss rates to prior conflicts. In the final issue of the "Southeast Asia Review," published in 1974, Air Force headquarters stated that the loss rate in World War II was 9.7%. In Korea, this number fell to 2%. By the time Vietnam ended, the number was only 0.4%. Of the more than two million combat sorties flown in Vietnam, only 2,257 of those ended in the loss of an aircraft. In the opinion of the Air Force, this decrease clearly proved that if extrapolated into future conflicts, the loss of aircraft would continue to drop. However, various leaders in the Tactical Air Command and especially young pilots in theater thought the loss rate did need to be addressed. These fighter pilots also believed there was a root cause to aircraft losses: poor combat training prior to deployment[79]

The single greatest problem faced by USAF pilots, both in SAC and TAC, during the Vietnam War was poor combat training prior to employment. This poor training reinforced poor tactics and doctrine during combat. More than any other organization the Tactical Air Command looked to make concrete changes to its combat training programs after the war. One of the first general officers to suggest changes to the Air Force's overall training process and its identity as a whole was General William Momyer.

General William Momyer, while Seventh Air Force commander in the Military Assistance Command Vietnam, strenuously lobbied his commander, General Westmoreland, to bring all aircraft under a single unified commander. Momyer had worked well with his in theater wing commanders to make concrete changes to training and operations and expanding his, or any

[78] Donald J. Mrozek, *The U.S. Air Force After Vietnam: Postwar Challenges and Potential for Responses* (Maxwell Air Force Base, Ala.: Air University Press, 1988), 17.
[79] ACC, TAC Files, Southeast Asia Review Files, "Southeast Asia Review: Final Issue," May 1974, 15.

other Seventh Air Force commander's authority, could only improve air power's effectiveness in theater. Westmoreland eventually relented, but Air Force Chief Of Staff General Curtis Lemay refused to let his strategic bomber assets be controlled by anyone who was not the Strategic Air Command commander. Momyer wanted to control all air assets because he believed that to "fragment airpower was to court defeat." Momyer left Seventh Air Force in 1968 and took command of TAC. This was the perfect location for Momyer to make changes to the poorly trained pilots he had commanded in Vietnam[80]

Tactical Air Command, under General Momyer, set about making internal changes to correct the errors of Vietnam but these changes took time. As early as 1965, TAC proposed to significantly expand the role of the Air Force's Fighter Weapons School. As previously mentioned, the official history of Tactical Air Command for the year 1965 stated, "In January, [Tactical Air Command], prompted by the general escalation of the conflict in [South Vietnam], sought [Air Force] approval to modernize the Fighter Weapons School at Nellis [Air Force Base], but the study was rejected on the premise that sortie rates coming out of [Southeast Asia] did not warrant an extension of the school's resources." In other words, the Air Force as an organization did not believe there was a serious enough problem to warrant a change in the way pilots were trained. By the early 1970s, as combat pilots began taking staff jobs inside TAC and at the HQ USAF the climate within the Air Force had changed. Combat losses of aircraft and men and the low probability of kill ratios by aircraft munitions led to a change in the way the USAF would train for future conflicts. A cadre of officers, primarily returning fighter pilots but also general officers moving into more senior leadership positions, emerged from Vietnam who

[80] Momyer, *Airpower in Three Wars*, 108

were convinced that the proper use of air power in combat had to be preceded by highly and, more importantly, properly trained combat pilots who could defeat the air and ground threats.[81]

In 1969, General Momyer wrote a paper on the changes needed to combat future threats. Although classified only as a "working paper" and never published, it clearly demonstrated Momyer's thoughts on the state of the tactical air forces at the time. The role of the tactical fighter force in the delivery of nuclear weapons troubled Momyer. The handwritten draft of the working paper in Momyer's files shows just how much he had shifted away from tactical aircraft being used for nuclear delivery. The paper began with a barrage about how complacency stifled creative thought about the future of air power and its roles and missions. Momyer argued that only a force capable of adapting to ever-present change would survive. The force that was satisfied with the status quo would not. Momyer believed that the nuclear mission in Strategic Air Command and Tactical Air Command overshadowed all others:

> Consequently, nuclear capability became a prerequisite to survival in the active combat establishment; there was a great scurrying within the services to qualify for this life insurance. Having once been accepted as a bona fide member of the nuclear team…the services settled into a comfortable, long-term posture, assured of their continued priority role and long life.[82]

Momyer also stated that the chances of using this nuclear force were "almost nonexistent." In the two major conflicts since World War II, the nuclear force was kept in reserve with no serious consideration given to its use; Momyer called it the "ultimate, last ditch, desperation force." Given this fact, coupled with the losses of tactical aircraft in Vietnam, Momyer noted air operations increasingly fell on the tactical fighters and he proposed a change. "The impact of

[81] Air Combat Command, Tactical Air Command History 1965, vol 1, 92.
[82] Air Force Historical Research Agency, General William Momyer Files, 168.7041, box 16, folder 14.

these developments (the futility of reliance on nuclear forces and the rise of tactical air power) is to shift the priority of the tactical forces, if not ahead of the strategic deterrent forces, certainly to equality with it [sic]." Momyer could not understand why tactical forces continued to be paralyzed with a nuclear mission that was antithetical to their original purpose and name. The training pilots received prior to the Vietnam conflict focused on delivery of nuclear weapons and destroying Soviet bombers, but not on air-to-air combat. Focusing on the tactical aspects of the fighter, Momyer committed, at least to himself, to upgrade, prepare, and train this force.[83] Momyer also attacked the holy grail of the strategic nuclear force, the Single Integrated Operations Plan. Perhaps this was the reason why the paper was never published and remained a working copy. The Single Integrated Operational Plan was, at the same time, untouchable. He believed the SIOP should not be the sole standard that fighter pilots trained against and should not determine unit readiness for combat, and, while he did not call for the complete removal of tactical aircraft from the plan, he did recommend strong revisions and changes. Momyer believed that tactical forces should make it a priority to train to perform counter-air, interdiction, and close air support, rather than stay fixed on nuclear strike. He then struck on a rather novel idea. If the tactical forces could be trusted to strike the enemy's deepest centers with nuclear weapons, could they not also strike the same centers in a conventional manner? Momyer not only wanted TAC to return to return to more traditional tactical missions, he also wanted TAC to expand its ability to conventionally attack strategic target sets. Momyer argued this was already occurring in Vietnam. By doing so, tactical air forces could strike at the heart and mind of the enemy and alleviate the need for a generalized nuclear strike. Momyer stated "Strategic-type target systems have been taken under conventional attack by the tactical forces….this new function might be called deep interdiction, deep strike, strategic attack, or some other suitable

[83] Air Force Historical Research Agency, General William Momyer Files, 168.7041, box 16, folder 14.

term, but regardless of terminology adopted, the new function should be recognized and documented." Although Momyer apparently never published the paper his writings indicate he was prepared to make major revisions inside the Tactical Air Command. As will be shown in the next chapter this is precisely what occurred. Momyer was the first of several TAC commanders to make fundamental alterations to the way the command trained for combat. [84]

In 1983, the eminent historian Russell Weigley said:

> The principal inclination even of the military was to repress the unpleasant Vietnam experience, to seek escape from the war's various traumas by treating the unconventional conflict in Vietnam as a military aberration, not likely to recur, while returning to preparations for supposedly more satisfactory kinds of conflict against major conventional military powers. The main trouble with this latter tendency is the likelihood that it is further unconventional wars in the Third World that are, in fact, more probable.[85]

Weigley was correct in his prediction. Some in the military attempted to repress the traumas of Vietnam. Some attempted to return to the status quo ante and forget the aberration. Yet, there was a small but growing core of individuals who set about changing training in new and innovative ways.

In the opinion of historians James Winnefield and Dana Johnson, the Air Force entered Vietnam "best prepared in air doctrine…and worst prepared in terms of hardware and trained personnel suitable for the task at hand." The problem was that current air doctrine was presupposed on a type of combat not faced in Vietnam. Momyer's paper was a rejection of current air doctrine, but the paper apparently sat in his desk drawer and it remains unclear who, if anyone, ever read it. In a broader context, the paper subverted the dominant paradigm and

[84] Air Force Historical Research Agency, General William Momyer Files, 168.7041, box 16, folder 14.
[85] Russell F. Weigley, "Vietnam: What Manner of War?" *Air University Review*, Vol. XXXIV, No. 2, January 1983, 114-120.

perhaps, that is why it was never published. Perhaps it would have ended his career. It is unknown whether Momyer circulated this paper to advisors or superiors. Following his stint as Seventh Air Force commander, he was reassigned as commander of Tactical Air Command. The man who believed that the tactical air forces needed to change the way they did business was now in the perfect position to make those changes a reality. Momyer, his successors, and the entire TAC organization moved forward with changing the way the USAF trained its combat pilots for war. [86]

Momyer and other officers recognized that the supreme failure of tactical air power in Vietnam was that pilots were not properly trained to conduct the types of missions they faced: air-to-air dogfights and air-to-ground destruction of SAM sites as well as tactical bombing missions. As General Charles Donnelly eloquently stated in the introduction to John Warden's *The Air Campaign*, "It is possible for an air force to have absolutely superior forces—numerically and qualitatively—and lose not only the air war but the entire war," or as Barry D. Watts succinctly put it, "Superior weapons favor victory. They do not guarantee it." General Momyer recognized that his in-theater pilots needed better training and a series of TAC commanders followed Momyer's changes with improvements of their own. Other senior officers including Generals Robert Dixon and Charles P. Disosway were also moving into command positions where they could influence the poor training standards. Junior officers who left Vietnam as lieutenants and captains would soon move into squadron leader roles and into staff jobs where they could influence current standards as well. [87]

The U.S. Air Force had not trained its personnel properly, and lives were lost. Even if the aircraft had been technologically superior in all the important ways they were only as good as

[86] James A. Winnefeld and Dana J. Johnson, *Joint Air Operations*, 80.
[87] Donnelly quoted in John Warden, *The Air Campaign*, xx; Barry D. Watts, "Doctrine, Technology, and War," paper presented at the Air and Space Doctrinal Symposium, 30 April 1996.

the men who flew them. The men had needed better training to prepare them for combat. The better trained the pilots, the more lethal the aircraft. It took more than a decade from the loss of the first U.S. Air Force aircraft in Vietnam for concrete changes to emerge to fix the problem.

CHAPTER 2 - Training Tactical Fighter Pilots for War

After Vietnam, a revolution took place that fundamentally altered the way the Air Force conceived of and executed warfare. This was a revolution in training, and it had as much of an impact on future conflicts as technologically advanced aircraft and munitions did. Having advanced fighter aircraft is, obviously, important to succeeding in combat, but the pilots inside the machine must be trained well enough to employ his weapon system. After Vietnam the U.S. Air Force, especially inside Tactical Air Command, changed the way it went about preparing the aircraft's "brain," or its pilot, for combat. Air-to-air combat was once called "the most glamorized and least understood aspect of aerial warfare," according to Colonel Robert Russ, a former fighter wing commander. Flying fighters was, and continues to be, more about physics, geometry, and understanding an aircraft's capability. Training changed in several important ways after Vietnam. The creation of the "designed operational capability" statements, called DOC statements for short, allowed a fighter squadron to focus on one primary mission. DOC statements detailed the primary and secondary mission a fighter squadron was capable of accomplishing and thus allowed more senior planners to easily task squadrons for particular missions. The creation of aggressor squadrons exposed pilots to air-to-air combat against dissimilar aircraft that functioned like enemy MiGs flown in ways that approximated enemy tactics; some pilots even found themselves flying against actual MiGs. Finally, official publications in the Air Force brought tactics and doctrinal discussions from the squadrons into the advanced schools for officer training and vice versa.[88]

[88] Robert D. Russ, "Air-to-Air Training Under the DOC System," *Air University Review*, Vol. XXVIII, no. 2, January 1977, 65-74. http://www.airpower.au.af.mil/airchronicles/aureview/1977/jan-feb/russ.html

It has already been established that the Air Force failed in many aspects of its handling of the Vietnam War, including along lines of command and control (a failure of leadership) and tactical employment (a failure of readiness and training). However, the failure in training was not linked to any failure in the technologies used at the time. The U.S. Air Force entered Vietnam with modern combat aircraft. There was no failure in technology, only a failure in the manner in which it was employed by the pilots. Air power historian Donald Mrozek once said, "In the aftermath of conflict, Americans adopting a critical stance have argued that the existing structure and doctrine had failed catastrophically. Yet others have looked at the same evidence and come to a different conclusion, basically because they used different standards." The standards the Air Force used after the Vietnam conflict ended, at least in the tactical community, tended to lean towards the former.[89]

Pilots were not prepared to face air-to-air or air-to-ground combat in Vietnam. They were not adequately trained to do so. Colonel Russ called pre-Vietnam flight preparation for fighter pilots, "…at best, less than optimum." Junior officers, and to a much lesser extent some senior leaders, recognized this and set about correcting this lack of training during and after the war. As early as 1971, with the war in Vietnam drawing to a close, Air Force leaders recognized they had just come through a reckoning and lost. Experiences by the Israelis during the 1973 Arab-Israeli War also demonstrated to American airmen that continuing to exercise current doctrine without improvements to training and weapons systems would lead to even greater failures. Four areas combined to enable an air force to gain and exploit air superiority in future combat. They were intelligence, doctrine, technology, and training. All four were given attention by Air Force leaders after the war but the one area after Vietnam that needed the most

[89] Mrozek, Donald J. "In Search of the Unicorn: Military Innovation and the American Temperament." *Air University Review,* XXXVII, no.6 (1986): 28-45. http://www.airpower.au.af.mil/airchronicles/aureview/1986/sep-oct/mrozek.html

attention was training. Proper training led to changes in tactics and changes in tactics led to changes in doctrine.[90]

General Robert J. Dixon stated after his retirement that "doctrine is sort of what you stand on while you make change. Doctrine has to be flexible enough to permit change." The "sort of" in Dixon's comment is important. It implied that the doctrine was merely a set of guiding principles and, while important, was not necessarily an unbreakable set of rules. Doctrine must be flexible enough to allow for change. There have always been those within the military, the self-professed "doctrine geeks," who hold rigidly to the principles codified in a written set of commands that they believe require strict adherence. After Vietnam, the process for changing doctrine and tactics and the way to train and exercise both became much more fluid, but only inside the tactical community. [91]

Since its inception, Tactical Air Command had struggled for money and manpower in the shadow of the dominant Strategic Air Command. General Quesada believed the command had been so sidelined that he asked for reassignment from being its commander and recommended to his pilots to leave the command. Tactical Air Command strayed from the principles it had [when] in an attempt to appear as much like Strategic Air Command as possible, as if to make Air Force and Congressional leaders believe that, if it looked like Strategic Air Command and acted like Strategic Air Command, it would be funded like Strategic Air Command. Tactical Air Command commanders in the mid-1960s set about changing this perception.[92]

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[90] Robert D. Russ, "Air-to-Air Training Under the DOC System," *Air University Review*, Vol. XXVIII, no. 2 (1977).
[91] General Robert J. Dixon, Oral History Interview, Air Force Historical Research Agency, 18 July 1984, K239.0512-1591 C.I, 192.
[92] Paul R. Schratz, *Evolution of the American Military Establishment Since World War II* (Lexington, VA: George C. Marshall Research Foundation, 1978), 63.

The first was General Walter C. Sweeney, Jr., who, according to General Robert J. Dixon in an interview conducted in 1984, "forced [Tactical Air Command], kicking and screaming, to move from being a rag-tag outfit that had fallen into being a junior [Strategic Air Command] focused on nuclear weapons into a professional full-service [Tactical Air Command]." Sweeney was a true member of the bomber mafia who had flown B-29s against Japan and was the first director of plans for Strategic Air Command. Many members of Tactical Air Command resented placing a Strategic Air Command man in charge of the tactical air power. Although he was a Strategic Air Command man through and through, when he took command of Tactical Air Command in 1961 General Sweeney insisted on having a fighter pilot as his aide-de-camp. A young major assigned to temporary duty in Buenos Aries received a telephone call ordering him to return to Nellis Air Force Base, pack his bags, and get to Langley as soon as possible. The young major was Wilbur Creech, a future TAC Commander.[93]

Sweeney's changes included increased realism for aircraft performing basic fighter maneuvers in certain training environments, notably an increase in the number of jets allowed to be engaged against another jet in a single training scenario, and an increase in the focus on close air support and tactical air-to-ground operations. The changes in training included allowing fighter pilots to actually dogfight one another at home station, and Sweeney also raised the restrictions against how many aircraft could participate in a particular scenario. Aircraft had previously been capped at one versus one, not a realistic scenario in combat. Creech also credited Sweeney with improving combat capability before the Vietnam War increased in size and scope. For all the tactical failures faced by the Air Force during the Vietnam conflict, it would have been substantially worse had a member of Strategic Air Command not headed

[93] General Wilbur Creech, Oral History Interview, Air Force Historical Research Agency, 1 June 1992, K239.0512-2050 C. I, 72

Tactical Air Command in the early 1960s. At this time, Tactical Air Command needed a leader to instill the discipline back into the major command. After his retirement, General Creech stated, "I will say that General Walter Campbell Sweeney, Jr., professionalized the Tactical Air Command. There is no doubt in my mind about that." Sweeney made no changes to the training regime and he certainly instilled the fear that the loss of an aircraft in training was the ultimate sin. But Sweeny did professionalize TAC and he laid the groundwork for other TAC commanders to make the necessary changes needed after the Vietnam conflict showed the problems in air crew training. Sweeney served as head of Tactical Air Command until August 1965. He died five months later of pancreatic cancer.[94]

Sweeney's successors were men who had experience in Strategic Air Command and Vietnam, but, more importantly, they had flown tactical fighters: Generals Charles P. Disosway, William W. Momyer, and Robert J. Dixon. Momyer was known as "Spike" in the aviation community; the name was not so much a call sign but a description of his personality. The moniker was well earned, as "he would pick a fight with anyone." He had flown fighters in World War II but missed combat in Korea while teaching on the staff at the National War College. Momyer and Sweeney had often clashed while the former was head of Tactical Air Command. Sweeney favored a gun on the F-4; Momyer opposed it. When Sweeney favored reconciliation with the Army over the Howze Board to save the Air Force's tactical assets, Momyer wanted all aircraft, even the Army's. Sweeney once said of Momyer that his biggest problem was that "his mother didn't teach him humility." Yet, Momyer was the perfect fit for a Tactical Air Command commander when he took over in 1968. His perception of airpower was

[94] General Wilbur Creech, Oral History Interview, Air Force Historical Research Agency, 1 June 1992, K239.0512-2050 C. I, 72; "General Walter Sweeney Jr. Dies," New York Times, 23 December 1965.

indeed all or nothing and he harkened back to Mitchell in his vision of air power under a single commander.[95]

Robert J. Dixon's story was quite different. Educated at Dartmouth, he entered the U.S. Air Corps in 1941 but was expelled from flight training for a lack of discipline. His commander, General Frank P. Lahm, recommended that he join up with the British or the Canadians. So strong was his desire to fly that he crossed the border into Canada and joined the Royal Air Force instead. In 1943, he found his way back under the stars and stripes, this time in the Army Air Forces. While serving as a reconnaissance pilot, he was shot down in February 1945 and spent the rest of the war in a German POW camp. The changes that Dixon initiated inside Tactical Air Command proved to have the most impact on the way the Air Force prepared for combat.[96]

These three men paved the way for subsequent Tactical Air Command commanders to prepare their pilots in a realistic manner that would help in real world situations. Through Vietnam and into the next decade, they transformed Tactical Air Command into an influential organization and one that had its own identity and purpose. The threat of the Soviet Union weighed heavily on the minds of Tactical Air Command's commanders. Most believed that a war between the United States and the Soviet Union was likely, and history had already proven in Korea and then in Vietnam that, even if there was little direct confrontation, there was conflict by proxy. The losses in Vietnam during Sweeney's, Disosway's and Momyer's tenures at

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[95] The Howze Board, named for Lieutenant General Hamilton Howze was created by Secretary of Defense Robert McNamara in 1962 to explore options to increase the mobility of ground troops. In response to the Howze Board, the Air Force established the Disosway Board named for General Charles P. Disosway. Although both boards came to different conclusions and ones that, not shockingly, preferred airlift organic to each independent service, each board at least recognized the need for better mobility on the battlefield, see William Momyer, *Air Power in Three Wars (WWII, Korea, Vietnam)*. Maxwell Air Force Base, Ala.: Air University Press, 2003; General Wilbur Creech, Oral History Interview, Air Force Historical Research Agency, 1 June 1992, K239.0512-2050 C. I, 75.

[96] General Robert J. Dixon, Oral History Interview, Air Force Historical Research Agency, 18 July 1984, K239.0512-1591 C.I, 1-2, 17

Tactical Air Command were unsettling. It also seemed that training at home stations was not preparing the Air Force for combat as General Dixon noted in 1984:

> If you take off from a base and go to a range that you are intimately familiar with which has nothing but very rudimentary equipment, no threat equipment, and you perform what amounts to calisthenics—you do the same thing day in and day out in a very unreal atmosphere—you are betraying the purposes of training; you are betraying the readiness of the crews.[97]

General Dixon would later say in 1984, "It seemed to me that what I had better do was put Tactical Air Command on the map…press the upper limits of our ability to innovate." At the same time that Dixon began to press the upper limits, junior officers below him had their own ideas about how to fix the command.[98]

To many in the Tactical Air Command, both senior and junior officers alike, the time for change began during Vietnam. At Tactical Air Command headquarters, General Momyer was not taking the reports coming out of Southeast Asia lightly. Momyer was a previous commander of the Seventh Air Force and commander in charge of air operations in Vietnam; the title is a bit of a misnomer, as has already been noted, Momyer actually did not command all air assets engaged in combat in Vietnam. Momyer began making changes to tactical air training immediately. In air-to-air training engagements, certain restrictions that existed to ensure safety at the expense of realistic training were lifted. Prior to this change, a universally assignable pilot who was new to flying fighters would be lucky if he experienced any basic fighter maneuvers prior to going to Vietnam. It was unheard of for pilots to receive training against multiple

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[97] General Robert J. Dixon, Oral History Interview, Air Force Historical Research Agency, 18 July 1984, K239.0512-1591 C.I, 246.

[98] Letter from General Larry Welch to General Charles Horner, 10 September 1999, Air Force Historical Research Agency; General Robert J. Dixon, Oral History Interview, Air Force Historical Research Agency, 18 July 1984, K239.0512-1591 C.I, 245.

adversaries. In other words, the first time a pilot might engage more than a single enemy aircraft would be in the skies over Vietnam without ever having done so before. Momyer recognized that this lack of realism was costing lives and changed the standing rules so that more than four friendly aircraft could engage enemy aggressors in large force employment tactics. Despite these initial changes, however, the headquarters-level Air Force and the Strategic Air Command were slow to grasp the need for further realistic training. [99]

Further changes came slowly, and senior leaders with experience in Vietnam began corresponding with one another to see what else could be done to ensure that losses of the kind suffered in Vietnam did not happen again. General George S. Brown, the Air Force's chief of staff in 1973, wrote a letter to Tactical Air Command Commander Robert Dixon, saying,

> I trust you share my concern over the question of future tactical air force effectiveness brought into question by the recent Israeli Air Force experience….I think it is apparent that surface-to-air missile defenses in the tremendous densities observed in this recent war do raise serious questions about the effectiveness of tactical air power. I have no doubt that air power is still the dominant factor in the land battle. Nevertheless, the price we would have to pay with the weaponry we have in hand doing our job against a well-equipped ground force would be unacceptably high.[100]

The 1973 Yom Kippur War was followed closely by the U.S. Air Force, and senior leaders found the problems of Vietnam reinforced. Although the Israeli Air Force decimated Egypt's and Syria's Air Forces with more than 300 confirmed aircraft destroyed, the surface-to-air missile batteries and anti-aircraft artillery guns downed more than one hundred of Israel's aircraft.

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[99] Air Combat Command, Tactical Air Command Files, 1973, vol 3, Air-to-Air Capabilities Improvement Plan

[100] Air Force Historical Research Agency, General George S. Brown Files, 168.7121, folder 19, letter to Tactical Air Command Commander Robert J. Dixon.

Reports pouring out of the Southeast Asian theater of operations in the 1960s and early 1970s indicated that an Air Force pilot's air-to-air capability was poor. The first step taken to fix the problem was the creation of the Air-to-Air Capability Action Group in June 1972. In a letter from Tactical Air Command headquarters to Air Force Chief of Staff General George Brown immediately following his accession to the position, the plans and programs office stated to the new chief, "The pragmatic factors of the communist bloc stratagem of hardened shelters and superiority in numbers underline the criticality of the air-to-air mission. Projecting the Southeast Asia kill ratios into a midintensity European conflict environment magnifies the problem of gaining and maintaining air superiority." In other words, if American pilots could not drastically increase the kill ratio while at the same time increase their own chances of survival, the war in the air against the Soviet Union looked bleak.[101]

Pilots returning from Southeast Asia also impacted air crew training as Vietnam drew to a close. These pilots, mainly captains and majors, directed the majority of their criticism at the unrealistic training and complete lack of realism they had experienced before going to Vietnam. Prior to and during the Vietnam conflict, many considered it impossible to realistically train for combat in an exercise environment. Even Colonel Robin Olds held that limits existed when he said in 1968, "So my point on stateside training is, you know, you just can't simulate these things, you've got to do them, and the only place to do them is in combat." The Graham and Red Baron reports both indicated the same thing. It seemed that training existed in one arena and the "school of hard knocks" of actual combat existed in another. The key to going through the first and being able to survive the latter was to merge the two in a realistic manner. Although all

[101] Air Combat Command, Tactical Air Command Files, 1973, vol. 1, 227; Air Combat Command, Tactical Air Command Files, 1972, vol. 3, 105.

training is simulated, the purpose of changes in that particular regime after Vietnam ended was to increase the level of realism to the point that pilots felt like they were in combat.[102]

Some pilots who returned from Vietnam allowed their bitterness and resentment to fester well after their tours of duty had ended. They decided that no amount of training improvement could change an Air Force that was, in their view, broken. Many saw the lucrative opportunities in jobs with commercial airlines in the private sector as a serious incentive to leave the Air Force. One young officer even went so far as to write his boss, the Tactical Air Command commander, a letter stating his reasons for leaving the Air Force. The infamous "Dear Boss" letter circulated through Air Force circles for decades, and while its cynical tone comes across to the uninitiated as nothing more than a junior officer's complaint, it very well shows the mind of the fighter pilot after Vietnam. Speaking of combat capability, the young major stated that his squadron mates "die wholesale every time the aggressors deploy—anybody keep score? Anybody care? Certainly not the whiz kid commander, who blew in from six years in staff…He told his boys… 'My only concern is not losing an aircraft.'" This particular pilot decided not to take his chances outside the Air Force and stuck with his job. The letter written to the Tactical Air Command commander apparently didn't hurt the pilot's chances for promotion. General Ronald Keys retired in 2007 as commander of Air Combat Command, making him the second four-star general to graduate from Kansas State University.[103]

One of the major problems in the training conducted by the Air Force prior to and during Vietnam was the overreliance on missile technology developed in the 1950s and 1960s. Many believed that the days of the fighter pilot were ending, and any engagements that did occur would undoubtedly take place beyond visual range. This reliance on missiles proved to be

[102] Air Combat Command, Tactical Air Command Files, 1973, Document #134; Robin Olds, Oral History Interview, Air Force Historical Research Agency, vol.1.
[103] C.R. Anderegg, *Sierra Hotel*, Appendix II, 190-192

unfounded; since the advent of beyond-visual-range missiles, only a small number of aerial kills have actually been achieved in this manner. A 2008 RAND Corporation report stated that between 1965 and 1982, of the 588 air-to-air kills by forces equipped with beyond-visual-range missiles, only 24 missile firings occurred beyond visual range. A different report painted an even bleaker picture for beyond-visual-range missiles by stating that out of 632 combat firings of beyond-visual-range missiles, only four kills were officially recorded as occurring beyond visual range. Two of these kills were credited to American pilots in Vietnam, and Israel claimed the other two, one in the 1967 Yom Kippur War and one in the 1982 Bekaa Valley War. The poor success rate of beyond-visual-range missiles proved that the technical feasibility of an undertaking does not necessarily make it operationally useful. Simply stated, even under ideal conditions, a missile fired from beyond visual range had very little chance of destroying its intended target. Time, training, and technology would change this reality, but only marginally.[104]

During Vietnam, Air Force fighters carried both long-range and short-range missiles. Enough evidence has been shown to denote that the firing of beyond-visual-range missiles in a combat environment was a rare occurrence. Furthermore, almost every air-to-air engagement in Vietnam took place well within visual range, rendering the long-range missiles unusable. Finally, rules of engagement almost always dictated that a pilot had to have confirmation that an enemy aircraft was indeed an enemy aircraft. Until the introduction of the airborne warning and control system (AWACS) aircraft and the powerful radars found on modern fighters, the only way to identify an aircraft was by human sight; the option for using a missile beyond visual

[104] John Stillion and John Perdue, "Air Combat Past, Present, Future," RAND report for Project Air Force, August 2008, http://www.defenseindustrydaily.com/files/2008_RAND_Pacific_View_Air_Combat_Briefing.pdf; Barry D. Watts, "Doctrine, Technology, and War," paper presented at the Air and Space Doctrinal Symposium, 30 April 1996; http://www.airpower.maxwell.af.mil/airchronicles/cc/watts.html

range in those cases was gone before the engagement began. The only real option was to have pilots trained and skilled enough to identify the enemy visually, close on him, engage him, and kill him.[105]

In a combat environment, once beyond-visual-range missiles have been expended or the enemy begins the engagement too close for the missiles' employment, the pilot must use his short-range missiles. The workhorse for close-in combat since Vietnam was the AIM-9 Sidewinder. Even with best-case scenarios, it was obvious that not every missile fired would hit its intended target. In all likelihood, a best-case scenario might well have been only half of the missiles fired hitting their target. Beyond the sheer physics and luck necessary for a pilot to successfully place his aircraft in the weapons employment zone, any number of other factors still impacted the missile's chances of hitting the target. A guidance fin might come off, the rocket motor might not fire properly, or the missile might get "hung" on the rail due to an improper connection or pilot error. This low probability of interception by the missiles led Colonel Hardenbrook, an F-4 pilot in Vietnam, to state that "if you pickled (fired a missile) one, then you had better pickle two." Beyond even the probability of a missile kill, Vietnam proved conclusively that fighter pilots on the whole were not prepared to operate in the "close-in" environment. If the days of the dogfight had ended after Korea, someone had forgotten to tell the pilots of the MiGs. This lack of missile reliability and pilots' ill-preparedness were two of the leading causes of the rise of large-scale exercises in the post–Vietnam era. The most famous of these exercises was Operation Red Flag. [106]

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[105] John Stillion and John Perdue, "Air Combat Past, Present, Future," RAND report for Project Air Force, August 2008, http://www.defenseindustrydaily.com/files/2008_RAND_Pacific_View_Air_Combat_Briefing.pdf; Barry Watts, "Doctrine, Technology, and War," paper presented at the Air and Space Doctrinal Symposium, 30 April 1996; http://www.airpower.maxwell.af.mil/airchronicles/cc/watts.html

[106] Colonel Jim Hardenbrook, email with author, 20 Oct 2011

Realistic Training

Changes in training after Vietnam have never been adequately addressed by historians. Training is essentially about the preparation and conditioning of the air crew members to prepare them as much as possible for future conflicts. Looking at training, then, is as much about *how* people learned as about what they learned in that environment. Colonel Mike Press, writing in 1986, said that "most analyses quantify combat capability as a product of numerous factors, such as aircraft, logistics, maintenance, munitions, etc. But the human factor (pilot ability, training, and tactics) is rarely discussed because its measurement is very subjective, and its impact on the equation so little understood." Still, the importance of good training has never been ignored by air force members. As early as the First World War, Germany set up specialized schools to teach new pilots fighter tactics. The course was taught by pilots with recent combat experience. As historian James S. Corum pointed out in his biography *Wolfram von Richthofen*, "In March 1917 the commander of the Luftstreitkräfte's Front Aviation Force ordered that in single-seat fighter pilot was to be posted to a front unit without going through a special fighter pilot's course." [107]

Just how important, then, was changing the way the Air Force prepared for combat? As General Holloway stated, "…not all pilots will have had previous combat experience. *Training* [emphasis in the original], then, becomes an important element in air superiority. Between 1954 and 1962, the [Air Force's] training curriculum for fighter pilots included little, if any, air-to-air combat." Those who study military engagements and those who actually engage in them all readily admit that training prior to conflict must in all ways possible mirror the reality of combat operations, although, as has been shown, there has not always been a commitment to realistic training. The complaints from veterans of aerial combat about the lack of realistic training did

[107] Mike Press, "The Human Factor: The United States Versus the Soviet Fighter Pilot," *Air University Review*, Vol. XXXVIII, no. 1 (1986): 72-78; James S. Corum, *Wolfram Von Richthofen*, 57

not begin with Vietnam. Rather, they are as old as aerial combat itself. George C. Kenney, air commander in the Southwest Pacific during World War II, made the same complaints about his experiences in the First World War. Although the U.S. Navy established its air-to-air training program in 1969, Tactical Air Command did not seriously consider instituting an independent school for air-to-air combat until 1971.[108]

As mentioned earlier, aircraft and their crews might very well be equipped to perform more than one type of mission, but combat in Vietnam showed that pilots conducting different mission sets never became proficient in any of them. Because Air Force squadrons were being tasked with too many missions, the Designed Operational Capability (DOC) statement was instituted in 1972 as part of the Fighter Weapons Symposium. Fighter pilots from across the U.S. gathered at Nellis Air Force Base, known as the home of the fighter pilot because the weapons school was there, to discuss the failures of Vietnam and how to fix them. The first step was to implement the DOC statement. As noted earlier, the statement assigned a primary and secondary mission set to each of the Air Force's flying squadrons. These assignments allowed members of a particular squadron to become highly proficient in one area and reasonably proficient in another. More importantly, it allowed war planners to know that squadron "x" had the ability to conduct offensive and defensive air-to-air operations, squadron "y" had the ability to suppress enemy air defenses, and squadron "z" had the capability of a deep strike. Each squadron was allowed to focus its individual training program on a primary area rather than attempt marginal success at numerous missions. [109]

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[108] Thomas E. Griffith Jr., *MacArthur's Airman: General George C. Kenney and the War in the Southwest Pacific* (Lawrence, Kans.: University of Kansas Press, 1998), 15; Air Combat Command, Tactical Air Command Files, 1971 Supporting Document #136; Bruce K. Holloway, "USAF Air Superiority in Tactical Air Warfare," *Air University Review*, XIX, no. 3 (1968): 2-15, http://www.airpower.au.af.mil/airchronicles/AURIndex.html#H

[109] Robert D. Russ, "Air-to-Air Training Under the DOC System," Air University Review, XXVIII, no. 2 (1977): 65-74. http://www.airpower.au.af.mil/airchronicles/AURIndex.html#AU

From an operational standpoint, the designed operational capability statements represented a baseline from which fighter squadrons could then train their pilots to proficiency based on the requirements laid out in the statements. Building combat capability required starting, quite literally, from the ground up. A building-block approach to conducting comprehensive air operations was implemented. Having offensive and defensive air-to-air missions codified on a designed operational capability statement was one thing, but the ability to carry out those assigned missions successfully was another. In addition to the DOC statements, the U.S. Air Force needed a way to train its pilots to meet the DOC statements intent. With the creation and implementation of the designed operational capability statements in 1972, the U.S. Air Force went a long way toward ensuring it could accomplish its missions. The DOC statements combined with a new training method that was being explored at the Fighter Weapons School at the same time.

The building-block approach was first envisioned by members of the Fighter Weapons Symposium in 1972, but it was significantly expanded by veterans of the Vietnam conflict and led by Major John Jumper beginning in 1974. The approach started with a pilot learning fundamental air-to-air skills learned not in the cockpit but in the classroom. Learning in the classroom was the first step. In the classroom phase, pilots learned about enemy threats and weapons employment, their own as well as an adversaries. Following the several weeks of the classroom lessons, instructors introduced junior pilots to basic fighter maneuvers, which comprised phase two. In that phase, flyers practiced maneuvering their aircraft against a reasonably cooperative target. The point of basic fighter maneuvers wasn't to kill the student, but rather to get him, by use of a mock combat scenario, to learn how his aircraft responded. This phase taught the student how to process all that was occurring inside and outside the

cockpit. Important practices to be mastered and turned into habits including "trigger squeeze, missile tone, and frames on target." Fighter pilots also practiced the equivalent of athletic agility exercises. In these exercises, a pilot learned how to maneuver and counter-maneuver his aircraft against a series of moves by the opposing aircraft. The agility exercises ended with a proper missile or gun-tracking solution being achieved.[110]

Phases three and four -- air combat maneuvers and air combat tactics, respectively -- combined the classroom lessons and the basic fighter maneuvers learned to this point. During these phases, pilots learned to work together as parts of teams in two-versus-one and two-versus-two (or higher) scenarios. Coordination and communication between air crews were stressed in the final two phases. Radio discipline and proper position were also put to the test. Aircraft placement was also important, and a fighter pilot knew his role by whether or not he was the "free or engaged fighter." A dogfight became less of an uncoordinated mess and more of a choreographed dance as each plane traded offensive and defensive positions in order to get a proper tracking solution and "kill" the enemy.[111]

The creation of the designed operational capability statements and the implementation of the building-block approach very rapidly improved combat capability in the Air Force fighter squadrons. The ability to focus on primary and secondary missions eliminated the need to continually attempt competency at too many types of missions. The building-block approach was a concrete step toward not only improving combat capability, but also, and more importantly, maintaining it. Successful completion of air combat maneuvers and air combat tactics did not end pilots' learning. Rather, once qualified, pilots continually expanded their knowledge through years of "continuation training," the weekly regimen of flying mock

[110] Ibid, 65-74
[111] Ibid, 65-74

engagements to maintain their combat proficiency. With each training sortie, fighter pilots became better trained and more lethal at employing their aircraft.

An important component of realistic air-to-air training is for pilots to experience engagements in training against a dissimilar airframe. If two F-4 Phantoms, for example, engaged in basic fighter maneuvers against each other, they are engaged in similar basic fighter maneuvers. However, if an F-4 fought a smaller, more nimble F-5 with characteristics closer to Russian-made MiG aircraft, the art of dissimilar basic fighter maneuvers was practiced. It was also important for the "adversary" to approximate as closely as possible the tactics enemy aircraft employed. During the 1960s, a pilot preparing for his first tour to Vietnam was lucky if he received any basic fighter maneuver training at all, and there was no chance that he would face a dissimilar threat. In the safety-conscious Air Force of the 1960s, the loss of a jet in training was far worse than the loss of one in combat. This meant that a pilot going into combat had never trained against a threat similar to Soviet-made MiGs. The need for air crews to engage in dissimilar basic fighter maneuvers was a major consideration for Tactical Air Command in setting up a new air-to-air training program. The Soviet aircraft were smaller, faster, and harder to visually locate than their larger American counterparts. One pilot, and later Air Force Chief of Staff, upon actually seeing the speed of these aircraft stated, "Why can't I think?" to explain the inability of Air Force pilots to react to the MiGs' advantage in size, speed, and ability to turn.[112]

Aggressors and MiGs

Between 1972 and 1976, Tactical Air Command established two aggressor squadrons, the Sixty-Fourth and Sixty-Fifth, to be co-located with the Air Force Fighter Weapons School at Nellis Air Force Base outside of Las Vegas. Later, other squadrons were established in Europe

[112] General John Jumper quoted in Steve Davies, *Red Eagles: America's Secret MiGs* (Oxford, U.K.: Osprey Publishing, 2008), 10.

and the Philippines to train United States Air Forces in Europe and Pacific Air Forces pilots. The creation of dedicated units to teach pilots how to fight MiG aircraft was another concrete step that improved combat capability after the Vietnam War ended. The Air Force designed these "enemy" squadrons to function as much like a Soviet fighter squadron as possible. They flew small aircraft, the T-38 and F-5, which closely approximated Soviet MiGs in size and maneuvering capability. In particular, the F-5 very closely mirrored the MiG-21, and because of this similarity, the F-5 was considered an ideal mock adversarial platform in the U.S. and Europe. The aggressors, to the extent that their capabilities allowed, flew using Soviet tactics. Air Force intelligence officers assigned to the squadrons combed their community for as much information as was available on Soviet weapons and tactics. The aggressor squadrons' mission was to travel the country to various squadrons and help Air Force pilots fly against an approximated Soviet threat.[113]

The aggressor squadrons were manned by the Air Force's best pilots, but not all of them were Vietnam veterans. One of the main points in assigning a young pilot to the aggressors was that after his three- to four-year tour, he was still junior enough in rank to go to another operational squadron and teach his squadron mates what he had learned as the "bad guy." The more senior the rank of an aggressor pilot, the more likely it was that it would be time for him to depart the flying community and go either to a school or to a staff tour. When that occurred, the pilot's knowledge of adversary's tactics and doctrine left with him.[114]

Becoming a member of the aggressors was no easy task. Most pilots selected to join one of the squadrons were requested by name by the squadron commander. The aggressors did not

[113] Air Combat Command, Tactical Air Command Files, 1972, Vol. I, 236; Air Combat Command, Red Flag Files, Red Flag Concept Briefing, December 1976
[114] Air Combat Command, Tactical Air Command Files, 1975, Fifty-Seventh Fighter Wing History, Vol. I, 25

trust the Air Force personnel center to send them the type of pilots they desired, aggressive but willing to learn; therefore, a pilot's reputation of his accomplishments or abilities in the fighter community was a very important requirement. After receiving the order to join the unit, new aggressors were sent to Washington, D.C., for several weeks for an indoctrination course on the Soviet Union taught by Air Force intelligence officers. The course was taught at Bolling Air Froce Base by the "foreign technologies division." The course included topics on Soviet history and culture as well as classes on Soviet pilots that provided information such as what strata of society they came from and how they were trained. The course also introduced American pilots to MiG aircraft in an up close and personal manner. Pilots were taken into a secure hangar where they viewed a MiG-21 and MiG-23. Later students also viewed Soviet air-to-air missiles. Only after the course did the students travel to Nellis Air Force Base to start their time as aggressors. The new aggressors had to learn to let go of the American way of approaching aerial warfare, and the pilots learned to rely on the ground-controlled interception operators to direct them, just as the Soviets did.[115]

The job of the aggressors was simple, although it was not to go out and "kill" the other fighter squadrons. The aggressors' job was to teach the fighter squadrons exactly what they could expect in a real air-to-air engagement with a Soviet MiG. The most important part of flying against the aggressors was not whether a pilot won or lost but what the pilot learned during the subsequent debriefing. In the 1970s, there were no computerized programs that successfully tracked where an aircraft was in the sky. It was left to each pilot literally to talk his way through an engagement. Vietnam combat pilot Jon Goldenbaum was a member of an

[115] Jon Goldenbaum, email with author, 17 October 2011; Jon Goldenbaum, email with author, 16 August, 2012; John T. Manclark, email with author, 27 August, 2012; Steve Davies, *Red Eagles*, 341.

aggressor squadron in its early days and he described the debriefing process, many years later in 2012, in the following manner:

> This was long before heads up displays and air combat maneuvering instrumentation, so we learned to talk into a crude cassette tape recorder hardwired into the aircraft. So for each engagement, you had to be careful to note your starting position, the position of the adversaries, sun angle, heading, cloud cover, etc. At each move in flight, you had to narrate what you were doing as well as [what] the adversaries [were doing]. For the debrief you took your cassette with you, played the critical parts, and drew the whole engagement on a chalk board using a different color chalk for each airplane. I can recall holding eight colors of chalk many times.[116]

The only thing better than flying against the aggressors was flying against an actual Soviet-made MiG, and Air Force leaders were hard at work having their best fighter pilots—those chosen to go the Fighter Weapons School at Nellis Air Force Base—train against the actual Soviet equipment. In the middle of the Nellis Air Force Base ranges there was, and is in 2013, a box-shaped air space on, which was normally off limits. This air space is Area 51. Over this air space select groups of Air Force pilots unexpectedly got the chance to dogfight against MiGs.

The best kept secret about Area 51 is that it was never a secret at all. The term "Area 51" immediately brings to mind secret government projects, "black operations," and perhaps even experimentation on extraterrestrials. Nothing could be further from the truth. Although admittedly sealed off from outside world, Area 51 has always been more of a testing center than anything else. It has never been a secret; the United States government has never denied its existence. In May 1955, the United States Atomic Energy Commission commissioned a

[116] Jon Goldenbaum, email with author, 17 October 2011.

construction project with the city of Las Vegas for "a runway, dormitories, and a few other buildings for housing equipment." From this tiny beginning grew a small, remote training base and one very big myth.[117]

While not all of the American Air Force's and other governmental agencies' declassified projects have come out of Area 51, a sizable number, including the U-2 and SR-71, have. The site was chosen by members of Lockheed's Skunk Works for its remoteness. If the site itself has never been a secret, the exact development of the site and research projects conducted there always have. Another remote Air Force station called Tonopah Test Range is also part of the Nellis Air Force Base ranges and sits West of Area 51. This remote post is also known for its own secret projects. In the early 1980s, the still-classified F-117 stealth fighter flew out of this range. Another group that flew from Tonopah in the same period was the 4,477th Test and Evaluation Squadron. This highly specialized squadron flew MiGs. The exact manner in which the Air Force acquired these aircraft is not known, although there are plenty of clues and possibilities.

In 2006, the Air Force admitted that a covert program, which went by the code name "Constant Peg," had existed at Tonopah from the 1970s until just before the collapse of the Berlin Wall. The Constant Peg program was a follow on of separate programs of MiGs that went by their own code names, including Have Drill and Have Ferry for the MiG-17, Have Donut for the MiG-21, and Have Pad for the MiG-23. The "Have" programs were not training scenarios; rather they were purely evaluations of the aircraft themselves and how they performed. This limited the number of combat pilots exposed to the MiGs. Many pilots flying during the Vietnam War were familiar with the Have reports but the experience gained from flying against the MiGs in a training environment was not part of the initial evaluation process.

[117] Peter Merlin, *Images of Aviation: Area 51* (Charleston, SC: Arcadia Publishing, 2011), 8

Constant Peg brought these aircraft together into a cohesive flight, and later squadron, whose purpose was to fly against students at the Fighter Weapons School and some Red Flag participants and teach Air Force fighter pilots how to shoot down MiGs. Former Air Force Chief of Staff, General T. Michael Moseley said in 2012 that "Constant Peg was a key, essential building-block in the development of training templates, the honing of leadership skills, the gaining of confidence, and in the development of winning air-to-air tactics."[118]

Steve Davies' recent work *Red Eagles* (2008) is the first attempt to show the history of the squadrons that flew the Soviet MiGs. Davies claims that much of the history of this unit was destroyed. This is not entirely true. The Air Force and other military branches, despite the proclivity for doing so in films, are not in the business of destroying their history. It is not that records were intentionally destroyed as they were not placed in official histories or, due their nature of their contents, remain classified in 2013. The parent unit of the 4,477th was the Fifty-Seventh Wing at Nellis Air Force Base, and the Air Force Historical Research Agency at Maxwell Air Force Base does have an official history of the 4,477th Test and Evaluation Squadron. In fact, the official file of every Air Force unit's patch and history is located at Maxwell Air Force Base. It is true that the report on the 4,477th Test and Evaluation Squadron is bland due to detailed operations information being left out, but the unit officially exists on the Air Force record books. Due to the unique mission of the 4,477th TES much of its official record remained classified. Col John T. Manclark was a former commander of the Red Eagles squadron and later as a senior executive service civilian heading the Air Force's Director of Test and Evaluation which was the focal point for "foreign materiel acquisition and exploitation." He

[118] Steve Davies, *Red Eagles: America's Secret MiGs*, 10; Air Force Historical Research Agency, Fifty-Seventh Tactical Training Wing History, 1980, xxx; Gaillard R. Peck, Jr. *America's Secret MiG Squadron*, 13, 25; also, see Appendix B: "USAF Constant Peg Announcement."

admitted in 2012 that much of what remained of the Red Eagles official files was destroyed on September 11th, 2001 when American Airlines Flight 77 crashed into the Pentagon. [119]

Much of what remains of the official record of the MiG flyers remains classified, and aspects of the unit will never be known to the general public. Bereft of primary sources or footnotes, Davies' book does not provide any avenue for further research. However, Davies' book is illuminating in that it is one of two works that details how the squadron trained American airmen; the other is *America's Secret MiG Squadron: The Red Eagles of Project CONSTANT PEG*, by Col (ret.) Gaillard R. Peck published in 2012. What is known of the 4,477th Test and Evaluation Squadron is illuminating, because it provides a window into tactical training of Tactical Air Command pilots in the 1980s. In addition, small clues do exist in the official histories of the Fifty-Seventh Tactical Training Wing. On 1 May 1980, the 4,477th Test and Evaluation Squadron was activated. The history from 1980 stated that the unit's official mission was simply "testing." The emblem file and lineage and honors data, the official file of every Air Force unit's patch and history, are located at the Air Force Historical Research Agency at Maxwell AFB. The emblem file of the 4,477th states the following about the squadron's mission: "AIRCRAFT: Unknown, OPERATIONS: Unknown." This information represents the entirety of the "official" history of the 4,477th Test and Evaluation Squadron. In response to an official request for the unit's history, a research assistant at the Air Force Historical Research Institute said, "It was practically impossible to determine what operational or training operations was being conducted" by this squadron. Therefore, Davies' work becomes that much more important because it is the single best source on the pilots and training methods of MiG

[119] Steve Davies, *Red Eagles: America's Secret MiGs,7*; Air Force Historical Research Agency, Fifty-Seventh Tactical Training Wing History, 1980, xxx, Col John T. Manclark, email with author, 6 September, 2012; USAF biographies, John T. Manclark, retrieved 07 Sept, 2012, http://www.af.mil/information/bios/bio.asp?bioID=6287; Gaillard R. Peck, America's Secret MiGs, 25

operations in the Air Force. There is no official tally of how many MiGs or with what variants of that aircraft the 4,477th operated. Years after he left Constant Peg and after the program had been declassified, Col Gaillard Peck, Jr. stated the initial inventory of aircraft were two MiG-17s and six MiG-21s. Later, the program had as many as twenty seven MiGs. In all likelihood, the Air Force obtained more than a dozen MiG-17s and MiG-21s and at least a few MiG-23s from various sources, most likely Middle Eastern and Southeast Asian countries that were friendly to the United States in the 1970s and 1980s. The MiGs of the Red Eagles trained with pilots at the Fighter Weapons School, Red Flag participants and the Navy's TOP GUN pilots.[120]

The accident rate in the Constant Peg program was larger than that of a typical Air Force squadron, due in no small part to flying a plane whose interior controls were written not only in another language but in another alphabet as well. The cockpit design was different from what the American pilots were used to, as were some of the general characteristics of the aircraft. For example, the MiG-21 did not have nose gear that could turn the aircraft. Therefore, the pilot had to rely on speed and the vertical stabilizers to turn the aircraft. Beyond simple quirks, there was the more immediate problem of maintaining the aircraft. All parts had to be either built on site or a suitable substitute found since Soviet-made MiG parts were not in abundance in the U.S. The members of the Constant Peg program suffered five major aircraft losses and the loss of two pilots during its existence. Senior leaders at TAC and inside the Pentagon were willing to allow these losses because they knew the training was important. [121]

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[120] The Air Force Historical Research Institute became the Air Force Historical Research Agency in 1991, the organizational histories division maintains the official emblem and records file for each United States Air Force unit and established organization. The 4,477th Test and Evaluation Squadron's information can also be located in histories of the Fifty Seventh Wing during the 1960s and through the 1980s; Gaillard R. Peck Jr., America's Secret MiG Squadron, 116.

[121] "Constant Peg," Air Force Magazine, April 2007; Gaillard R. Peck, *America's Secret MiG Squadron*, 171

The aggressors and the secret MiGs emulated the Soviet style of aerial warfare; from an American fighter pilot's perspective, the Russians were sneaky bastards who didn't play by the rules, at least the "rules" as Americans understood them. Many factors decided who would win in an aerial engagement. Speed, altitude, aircraft size, thrust, nose position, by munitions carried, and angle of attack were all determining factors in any engagement. In the late 1960s and early 1970s, fighter pilots were just beginning to come to terms with the complex physics of energy maneuverability theory quantified by fighter pilot Colonel John Boyd and mathematician Thomas Christie. In certain scenarios it would be more advantageous to gain a visual identification and then fly past the enemy without maneuvering also known as a "blow through" which allowed for a well-placed wingman to take a shot. In other instances the flight lead might determine that "anchoring" with the enemy was the preferred method and attempt to maneuver into an advantageous firing position.[122]

Engaging against the aggressors or MiGs had an immediate impact on fighter tactics. Since World War II, the standard flight consisted of four aircraft, with one flight lead and his wingman "2," "3," and "4" flying in a fingertip formation, commonly called "fluid four." The basic fighting unit was two sets of aircraft conducting operations in the "welded wing" formation, so named because the job of the wingman was to stay as close to the flight lead as possible during an attack while keeping watch on the lead aircraft's six o'clock position. As one aggressor stated, "fluid four sucked." There were several problems with the F-4 flying in this welded-wing fashion. The first was that the jets, when separated by roughly a few thousand feet, were visible from miles in any direction due to the smoking engines. A T-38 aggressor would thus see the aircraft coming and set upon them at will. A second problem occurred when the

[122] John Boyd, Aerial Attack Study, 11 August 1964, retrieved from "Air Power Australia," http://www.ausairpower.net/APA-Boyd-Papers.html

aircraft were engaged in an actual dogfight; the wingman had his mental capacity strained attempting to stay on his flight lead while at the same time looking over his shoulder to "check six," and follow the flight lead. The wingman became nothing more than another aircraft to shoot down, because attached to the flight lead, he posed no threat to the attacking aggressor. It was also considered heresy for a wingman to take an offensive action.[123]

To fix this dilemma, fighter aircraft began to loosen up the formations. Rather than stay separated by 2,500 feet and follow in trail of the flight lead, the wingmen separated sometimes as much as a mile away from each other.The separation of the wingmen went by many names, including "loose deuce," "double attack," and "fluid two." The aircraft began to work in tandem to defeat an enemy. The pair of fighters used brevity codes, a one or two word answer, to limit communication, which lessened distractions. If one fighter was engaged against an enemy, his wingman maneuvered to a favorable position against the threat. The wingman could thus support the flight lead by providing an extra set of eyes and help vector the lead, if necessary, or warn him of other dangers. If the attacking aircraft found itself in a vulnerable position due to loss of speed or energy, the wingman would be in a position to engage the enemy. The previously engaged fighter would then use his thrust to regain speed and energy and position himself to offer the same support previously afforded him. Thus, each aircraft labeled "free" or "engaged" was able to mutually support the other while not being attached. Each aircraft had freedom of movement while at the same time working in conjunction with one another. The flight lead retained ultimate and unquestionable authority, but his wingman became a potent threat. Each aircraft became a potential shooter. An enemy flight of MiGs now had to divide its attention between several offensive aircraft. The changes in tactics pushed the bounds of

[123] C.R. Anderegg, *Sierra Hotel*, 83; Robert D. Russ, "Air-to-Air Training Under the DOC System," Air University Review, XXVIII, no. 2 (1977).

previously accepted fighter maneuvers. Tactical fighter pilots, unlike prior to Vietnam learned how to engage and destroy enemy fighters. This allowed more freedom of movement for other attacking aircraft. Again, unlike Vietnam, tactical fighters learned how to gain air superiority in a rapid fashion[124]

American pilots in F-4s and later F-15s learned how to effectively maneuver their aircraft against the foreign-built planes. For instance, they learned not to turn with the MiG-17 and MiG-21 or F-5s if the opponent was an aggressor squadron. The foreign-built planes were smaller, lighter, and faster than the jets the Americans flew. The MiG-17 and MiG-21 had an extremely tight turning circle, but turning bled the speed and energy of the aircraft so much that the MiGs were essentially dead in the air after a single pass. To counter this quick turn, pilots learned to take the engagement into the vertical, where the powerful American engines could gain speed and energy over their opponents. In addition, the pilots learned to close with MiG-23s as quickly as possible, because the larger MiG-23 wasn't capable of turning in a fight. Bob Drabant, the original Have Pad pilot, stated in 2012 that the MiG-23 "…could accelerate like no other fighter we had seen…" but, it "…was not a dogfighter and could be easily defeated." The MiG-23 pilots would attempt to fire from a distance and then "blow through" and run or use one ship as a decoy while a second maneuvered for a conversion from the back of the blue forces unbeknownst to the pilots. The American pilots found the only way to defeat the MiG was to draw its pilot into a turning fight or to use the F-15s superior radar to "lock" the MiG-23 and shoot it head on. [125]

Graduates of the Fighter Weapons School took their knowledge back to their operational squadrons and taught their fellow flyers how to fight MiGs. The MiGs that Fighter Weapons

[124] Mike Press, "The Human Factor," xx.
[125] "Constant Peg," Air Force Magazine, April 2007; Davies, *Red Eagles*, 298-300; Bob Drabant quoted in Gaillard R. Peck, *America's Secret MiG Squadron*, 97-100.

School attendees learned to fly against were also found in abundance in the Iraqi military in 1991. The Constant Peg Program existed from 1979 until 1988 and exposed over 5,900 American air crews to air combat with MiG aircraft. The vast majority of these, some 3,600, were Air Force crews.[126]

While the revolution in training was getting under way, equally important reformations and reconciliations were taking place in the realm of professional military education. Each service operated various schools that military officers attended depending upon various factors including rank, time in grade, and potential for promotion. At the Army's Command and General Staff College and the Air Force's Air Command and Staff College, most of the attendees in the 1970s were veterans of the Vietnam War. Young lieutenants and captains in Vietnam were now majors and ripe for attendance at the military's equivalent to a master's program in the military art.

The schools themselves have always served as sounding boards for ideas and concerns of the various services. Their publications, including the various journals produced in-house near each school, proliferated what Donald Mrozek called "official and quasi-official viewpoints" of the service branch writ large, the faculty, and those going to the schools in residence. After Vietnam, each service attempted to come to an understanding of what went right, what went wrong, and where to go from that point on. At the military schools for mid-rank officers, the need for catharsis after Vietnam motivated students to come to an understanding what had just occurred. The Command and General Staff College and Air Command and Staff College were also where tactical-level officers experienced operational-level training for the first time. This often led to friction created between a mid-grade officer's desire for continued focus on the lower-level tactical practices he was used to and the school's focus on the operational level.

[126] Gaillard R. Peck, Jr. *America's Secret MiG Squadron*, 175.

Many of those returning from Vietnam chose to write their thesis papers on various aspects of their particular service that they believed needed changing. For example, in 1978 a young Air Force major, and future Chief of Staff of the Air Force, named John Jumper wrote a thesis called "Tactics, Training, and Evaluation: Toward Combat Capability."[127]

Jumper flew F-4s in Vietnam and knew firsthand the way in which poor training had directly contributed to higher loss rates in Vietnam. Prior to attending the Air Command and Staff College, Jumper had been an instructor at the F-4 Fighter Weapons School. The school had its own official publication, the *Fighter Weapons Review*, in which changes in tactics were often discussed before their inclusion as accepted doctrinal practices. Jumper was well known among other fighter pilots for his articles in *Fighter Weapons Review*. Chief Air Force Historian C.R. Anderegg called Jumper one of the most "articulate and prolific instructors" at the Fighter Weapons School and stated that Jumper helped lead the effort to change training after Vietnam ended. In two issues of the *Fighter Weapons Review*, Jumper "laid the foundation for training techniques that would spread throughout the tactical air forces over the next decade." Jumper used his year at the Air Command and Staff College to expand on material he found relevant to his career field.[128]

In his thesis, which expanded on his work published in the *Fighter Weapons Review*, Jumper argued beyond the need for more realistic training, which will be covered in the next section. Major Jumper brought forth a new to train fighter pilots at their home stations to be better at their vocation. The building-block approach had been adopted by the Fighter Weapons School as the best way to train pilots who had not flown in Vietnam. The concept was simple yet revolutionary at the same time. While not dictating the exact number of sorties necessary for

[127] Donald J. Mrozek, *The US Air Force After Vietnam*, 43.
[128] C.R. Anderegg, *Sierra Hotel*, 54

a pilot to become proficient, Jumper's method started from the basics. First came basic fighter maneuvers against a dissimilar aircraft type; this training focused on a one-on-one tactical engagement. Once the pilot had demonstrated proficiency in this realm, he could move on to air combat maneuvering, in which he was supporting, or being supported by, a wingman. These were two-versus-one engagements. Further proficiency allowed the pilot to progress to air combat tactics, which involved a specified number of friendly aircraft against an unspecified number of adversaries. Furthermore, while Jumper believed that the weapons school at Nellis Air Force Base should remain the central location for tactical changes to be explored, he saw no reason why the building-block approach could not be applied inside any squadron at any base. Fighter pilots should not have to wait for an operational-level exercise to push the limits of their training.[129]

The revolution in professional education continued into the 1980s as military leaders attempted to craft the next generation of warrior scholars. In 1984, the Army created the School for Advanced Military Studies, a one-year follow-up to the Command and General Staff College for the very best pilots. The Air Force followed suit in 1988 with the creation of the School for Advanced Air Studies. These schools were meant to train operational-level thinkers who could plan military campaigns. In the Air Force, graduates of the School for Advanced Air Studies quickly became sought after. [130]

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[129] Major John Jumper was a prolific writer and published several articles in the Fighter Weapons Review, also discussed in this dissertation. Jumper went on to become the commander of Air Combat Command and the Air Force chief of staff in 2001. His colleagues at the weapons school included an illustrious who's who of the Air Force in the early days of the twenty-first century. Members were Richard Myers, who became the Chairman of the Joint Chiefs of Staff; Ronald Keys, who became Air Combat Command Commander; and Dick Anderegg, who became the Chief Air Force historian. John P. Jumper, "Tactics, Training and Evaluation: Toward Combat Capability" (Maxwell Air Force Base, Ala.: Air Command and Staff College Thesis, 1978).

[130] The School for Advanced Air Studies later became the School for Advanced Air and Space Studies. Although neither school had an effect in publishing anything relevant prior to Desert Storm, the schools

The late 1970s saw tremendous growth in the Air Force's training programs for its combat pilots. The Constant Peg program, the creation of the Aggressors, and changes at the Fighter Weapons School all improved combat capability, but it was reaching only a limited number of pilots. Only a select for were chosen to attend the weapons school and an even smaller number trained against the MiGs. The Air Force needed a larger venue to train its pilots.

still produce the next generation of warrior scholars, and the workload in the year assigned to the school is intensive, especially for fighter pilots.

CHAPTER 3 - Operational Exercises

The creation of the training exercise Red Flag in 1975 and subsequent exercises were the most important steps in achieving the later battlefield success of the 1990s. The Air Force fixed its technological shortfalls after Vietnam, and while technology may be a decisive factor in conflict, having advanced weapon systems is not the same as employing them. Furthermore, employing weapon systems in training is also different from doing so in combat. By the middle of the 1970s, the pieces were in place for the Air Force to make serious strides in the way it conceived of and executed air warfare. With the production of new weapon systems, exploitation of new technologies, especially low observability, also known as stealth, and removal of certain restrictions on training, all that was needed was a central location to bring all the pieces together. Operational- and tactical-level exercises were not new to the Air Force; in fact, they had existed as long as the air elements themselves. In 1949, the Air Force held the first air gunnery meet at what was then still known as Las Vegas Air Force Base. However, it could hardly be called a training exercise, because it was more like a sporting event than a military exercise with teams attempting to get the highest score. Peacetime training for war was not something the Air Force had yet figured out how to accomplish.[131]

Beyond that, however, and in some ways more fundamental was the fact that the Strategic Air Command dominated resources, while Tactical Air Command was relegated to interceptor missions or tactical nuclear delivery. The focus on a possible European war had made serious exercises for tactical air forces difficult. There was also the safety issue. Accidents occurring during air combat training in the 1950s and 1960s troubled Air Force

[131] Ninety-Ninth Air Base Wing History Office, 1949, gun meet scores.

leaders so much that a wing commander or squadron commander could lose his job if his men suffered an accident or lost an aircraft; the easiest way to lose an aircraft was during the dangerous air-to-air training. In an environment where the daily duties were inherently dangerous anyway, the choice became whether to do the dangerous work necessary to teach pilots how to dogfight or not conduct that mission at all. Many commanders erred on the side of caution, and the ability to conduct air-to-air combat slowly disappeared from a pilot's skill set. Air Force historian C.R. Anderegg stated that the fear engendered in the wing commanders found its way down to the line pilots and "spawned a culture of extreme conservatism within [Tactical Air Command]." Prior to the Vietnam War, pilots fell into a routine of logging hours rather than conducting effective preparation. [132]

However, those fighter pilots affected in the crucible of Vietnam vowed to never allow tactical forces to be subordinate to Strategic Air Command or an equally meaningless hollow force. Majors and lieutenant colonels who had been lieutenants and captains during Vietnam were now serving on the Tactical Air Command and Air Staff. These pilots were in a position to make changes that they considered legitimate including, the creation of realistic training exercises. They believed that, if training could be changed to more closely resemble combat, then they could save lives in the next conflict, whether that conflict be against the Soviet Union or an unknown enemy. Many mid-grade officers had no knowledge of the great changes in technology that would fundamentally alter aerial warfare, which would create the conditions and a new urgency for the ascendance of tactical air power. So they pressed hard for change in what they *did* know had gone wrong in the past and could be righted no matter what happened in the area of technology, and this was to focus on improving training The stage was set for the merger of tactical and strategic air power.

[132] C.R. Anderegg, *Sierra Hotel*, 80.

The first attempt at training for air war was the exercise named Coronet Organ. A precursor to the now-famous Red Flag, Tactical Air Command's Coronet Organ exercises began in the late 1960s to teach air warfare at the tactical level. Coronet Organ integrated all Air Force systems and functions into a single cohesive and centrally run air plan against highly integrated air defense systems. In the exercise the commander of Tactical Air Command, General William Momyer, specifically tasked "as many tactical roles and missions as possible." Furthermore, Tactical Air Command Commander General Momyer was so impressed with the Coronet Organ exercises that he asked for an increase in the number of exercises. General Momyer asked for an increase in the "use of live ammunition, tankers, Wild Weasel, and electronic countermeasure pods." Momyer was interested in increasing the realism faced by the operators at every step of the training process. He understood Tactical Air Command's problem and his "understanding of tactical air power…dwarfed that of anyone else." Momyer's experience as an air commander in Vietnam allowed him more than any other person to see the need for more realistic training scenarios. Contrary to what has been written by Tom Clancy and C.R. Anderegg, Momyer and his successors, Generals Disosway and Dixon, needed no convincing to implement new programs. Rather, the three Air Force leaders set about making concrete changes to the tactical air forces from their earliest days as Tactical Air Command commanders. Momyer and Dixon set about revolutionizing the way Tactical Air Command pilots were trained. The initial steps that Momyer took may have been modest, but the general recognized the need to integrate his changes into a single cohesive exercise that would simulate war. Still, the Tactical Air Command needed a progressive thinker to go beyond Momyer's changes if it were to achieve changes that would have effects on the battlefield.[133]

[133] Tactical Air Command History, 1971, vol 1, 212-219; "Coronet" was the name given to any Tactical Air Command operation, and Air Combat Command continues to use the designation in 2013; C.R.

In early 1975, Dixon, who had become commander of Tactical Air Command, issued an order to his subordinates to establish areas where air crews could be trained in a realistic manner. Dixon also wanted to use modern technology (in this case, remote TV systems) to track results of air crews engaged in training. Dixon sent members of his staff across the country to locate surplus military aircraft, vans, tracked vehicles, guns, and trucks—anything he could use to simulate a fielded army. He also wanted his commanders to visit the hundreds of active duty bases to determine which ones had ranges on their installations. He wanted answers to the following questions. How big were the ranges? How many aircraft could be bedded down at each base? Were there other bases nearby that could serve as auxiliary fields? He told his subordinates to get him answers and equipment through "local initiative, imagination, and self help." Dixon also told them that his staff was addressing funding issues, but it seemed obvious that with or without money Robert J. Dixon was going to train his air crews.[134]

RED FLAG

Operation Red Flag, conducted out of Nellis Air Force Base in Nevada, began in 1975. Even as early as the 1980s, many Air Force members, but especially those in the Tactical Air Command and later Air Combat Command, considered it the single greatest operation to come out of the ashes of the Vietnam conflict. While it is never appropriate to credit the creation of any one program to one person, most members of the Air Force's fighter community will state unequivocally that the "father of Red Flag" was Lieutenant Colonel Richard "Moody" Suter. In 1975, Suter, at the time a major, was serving in the Tactics Division at the Headquarters Staff of the Air Force in the Pentagon. Air Force historian C.R. Anderegg called Suter "the man of a thousand ideas." Beyond ideas, Suter also had a vision, one that entailed a large-scale exercise

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Anderegg, *Sierra Hotel*, 74-76.

[134] Tactical Air Command History, 1975, vol. 3, message from Tactical Air Command commanders to subordinates.

that brought together many different tactical platforms in a realistic training environment. His vision would become, as Mike Press stated in his 1984 article for the *Air University review*, "The Human Factor: The United States Versus The Soviet Fighter Pilot," the "most realistic and ambitious training program in the world."[135]

Air Force leaders understood that training was important because they knew it had a direct correlation with combat operations. Although a combat operation provided the ultimate test of a pilot's abilities, it was not the best place for inexperienced pilots. General Holloway had stated in a 1968 *Air University Review* article that "It is probably not possible to quantify the value of professional experience—combat experience. We all know it is important; but how important and how to weight combat experience as compared to technical factors…are questions with no clear answers." Suter, on the other hand, was sure he knew exactly how to quantify experience, and he knew just how much was needed to increase survivability in combat. Suter was familiar with the Red Baron reports indicating that a fighter pilot's chance of survival in a combat environment increased drastically after his tenth mission. Suter was looking for a way to

[135] Ronald L. Rusing, "Prepare the Fighter Force: Red Flag/Composite Force" (Fort Leavenworth, Kans.: Command and General Staff College Thesis, 1980), 9; Alexander Berger, "Beyond Blue 4: The Past and Future Transformation of Red Flag" (Maxwell Air Force Base, Ala.: Air Command and Staff College Thesis, 2004), 1-5; Clarence Anderegg, conversation with author, 10 March 2011; Richard M. Suter, "Janus: A Concept for a Multipurpose Autonomous Fighter," *Air University Review*, May 1981. One of Colonel Suter's "thousand ideas" was his concept for a fighter aircraft in which the weapons system officer faced to the rear of the aircraft. Suter named his aircraft concept, appropriately enough, "Janus." Suter believed it afforded 360 degrees of visual coverage to ensure that the vulnerable cone behind the pilot, or the "six o'clock," was always covered. He also believed that this would negate the need for fighters to fly in pairs; in other words, it would permanently do away with the need for a wingman. Without the need for a wingman, the fighter force would essentially be doubled since each aircraft could become master of its own domain without the need for protective cover afforded by the now-defunct wingman concept. The idea never gained serious traction in either the United States Air Force or other services. As to whether or not an officer facing to the rear of the aircraft would suffer from increased vertigo or other physiological symptoms, Suter believed it would just be a matter of proper acclimatization. Mike Press, "The Human Factor: The United States Versus The Soviet Fighter Pilot," *Air University Review*, November 1986.

realistically simulate those first ten missions. Furthermore, Suter conceived of an operation in which units could exercise their primary designed operational capability statements.[136]

Suter took his concept on the road to Nellis Air Force Base, where he met with members of the aggressor squadrons and Fighter Weapon Schools. The brief itself was simple enough to understand. Suter explained that Tactical Air Command was undergoing a "tremendous force modernization," and he was looking for a location where all tactical assets could train together in a single exercise. This training would also serve to ensure that each successive generation of fighter pilot would always be ready for combat, rather than having to be "trained up," as was historically the case. Since one of the primary participants in each exercise would be the aggressors acting as Soviet fighters, the cover of Suter's brief had a large Soviet-style red flag on it. The name "Red Flag" seemed to fit Suter's intent. The commanders of the aggressor squadrons and the Fighter Weapons Schools at Nellis Air Force Base supported Suter and indicated that they could do the mission. Having this key piece of support, Suter returned to the Pentagon to prepare for his next hurdle.[137]

Upon returning from Nellis Air Force Base, Suter drove south to Tactical Air Command headquarters at Langley Air Force Base, where he had briefed the Deputy Chief of Staff for Requirements Major General Howard Leaf. Leaf was impressed with the brief, but, since he was not in a position to act on the information, he told Suter that he was "in the right church but the wrong pew." Leaf arranged for Suter to present his concept to the Tactical Air Command Commander General Robert J. Dixon on 16 July 1975. Known affectionately around Tactical Air Command headquarters as the "Tidewater Alligator," Dixon was known for being "tough, demanding, and suffering no fools" as a commander. Although some have called him a

[136] General Bruce K. Holloway, "USAF Air Superiority in Tactical Air Warfare," *Air University Review*, vol. XIX, no. 3 (1968): 2-15. http://www.airpower.au.af.mil/airchronicles/AURIndex.html#H
[137] Air Combat Command, Red Flag Files, Initial Red Flag Brief, 1975.

"Strategic Air Command general," he flew tactical fighters in World War II and served as a prisoner of war after being shot down. He flew fighters again in Korea. He was tactically minded and keenly intelligent, and he approached each problem from a deeply analytical standpoint. He was also inclined to see more realism placed into Air Force training methods.[138]

In his book *Every Man a Tiger* (1999), Tom Clancy boldly stated that the Red Flag concept had to be "sold" to General Dixon, a man known for his "indiscriminate hatred." Nothing could be further from the truth. Since Dixon had already directed officers to "establish realistic target arrays on the tactical ranges," it made no sense to imagine the commander being "sold" something he had already endorsed in a similar form. Clancy also claimed that prior to giving the brief to Dixon, Suter was running into trouble getting anyone else to approve the idea. Clancy stated, "Red Flag was taking shape conceptually. Meanwhile, however, it was running into bureaucratic problems. Though the fighter mafia had tried to push the idea up the chain at [Tactical Air Command], the support of colonels and generals leery of Dixon's temper was conspicuously absent." Quite to the contrary, in fact, the historical files of Tactical Air Command clearly show that everyone who received the Red Flag brief approved of it. Furthermore, many officers who worked directly for Dixon took umbrage at Clancy's characterization of him. Finally, the trend set under previous Tactical Air Command commanders indicates that strong support for exercises along the model of Red Flag already existed. Generals Sweeney, Momyer, and Disosway the three previous Tactical Air Command commanders, prepared the organization for changes. Dixon's policies were a continuation of

[138] Air Force Historical Research Agency, Robert J. Dixon Files, letters from Lieutenant General Howard Leaf and Major General Gerald Carey.

those of his predecessors in making Tactical Air Command a formidable organization inside the Air Force and a credible threat to the Soviets.[139]

The meeting between Suter and Dixon held on 15 July, 1975 went well. Dixon enthusiastically approved the Red Flag concept on the spot. Red Flag would belong to the U.S. Air Force Tactical Fighter Weapons Center at Nellis Air Force Base under the command of Major General James A. Knight. Responsibility for overseeing the creation of Red Flag fell to Knight's deputy, Brigadier General James "Robbie" Risner. Two days later, Dixon received a message from the Chief of Staff of the Air Force General George Brown, who said, "Comments from my staff indicate your enthusiastic support of the Red Flag concept….request you take the lead in validation, development, and implementation." Red Flag had been given official approval for execution. Beyond giving his approval, Dixon wanted Red Flag to begin operations as soon as possible. He instructed his comptroller to find the money, and he ordered the commanders at Nellis Air Force Base and his operations officer to prepare for the exercise without delay.[140]

One of the issues that Dixon and Suter faced early on was the reality that, if fighter pilots were going to get realistic training, they were going to be doing things that were dangerous—so dangerous that the Air Force still generally forbade this type of training for fear of losing aircraft and air crews. Although the need for realistic training was obvious, Dixon was unequivocal in his desire that certain risk mitigation should exist among the pilots and especially the

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[139] Tactical Air Command History, 1975, Air Combat Command History Office, vol. 3. Tom Clancy and Charles Horner, *Every Man a Tiger* (New York: Berkeley Publishing Group, 1999), 128-130; The Air Force Historical Research Agency holds four letters from retired Air Force general officers (General Larry Welch, Lieutenant General Howard Leaf, Major General Gerald Carey, and Major General George Edwards) who dispute Clancy's account.

[140] Tactical Air Command History, 1975, vol. 3, message from the chief of staff of the Air Force to the Tactical Air Command commander, dated 18 July 1975; Air Force Historical Research Agency, General Robert J. Dixon Files, General Larry Welch, "The [Tactical Air Command] Flags programs."

commanders of the fighter units participating in the operation. At the same time, however, Dixon did not want to interfere with their ability to carry out the exercise:

> I won't have a rule that says you can't go below 500 feet, because in order to do effective training you must go below 500 feet. But I will hang, draw, and quarter the man that takes a second lieutenant below 500 feet who has never been there and who doesn't know enough about him except to take him down there and get him killed. If you kill him, you are responsible to me for killing him. When you have an accident, don't bring the corpse in here. You come in here and explain to me what happened and how come you let that happen.[141]

Dixon's pragmatism extended beyond the pilots to those he entrusted to make Red Flag a reality. Dixon knew the Air Force's proclivity for wanting to avoid training accidents, and this weighed heavily on his mind as Red Flag was moving from its conceptual phase to its operational one:

> …that process required some very, very dangerous work on the part of people like "Jim" Knight [Lieutenant General James A. Knight, Jr.], whom I assured I would protect if, as I thought probably inevitable, in our haste and premature adventures into realistic training, an accident happened, and we were criticized for it. I must say I had the support of the chief of staff, General Brown, when we just barely got started, and General Jones subsequently. I never really had any trepidation that anything would happen to General Knight, nor for that matter to me, as the result of doing that, but it was quite possible that

[141] General Robert J. Dixon, Oral History Interview, Air Force Historical Research Agency, 18 July 1984, K239.0512-1591 C.I, 282.

we could have set the program back had we not been extremely lucky and extremely careful and if the people at Nellis had not behaved in a very superb fashion.[142]

In retrospect, it is astonishing how quickly Red Flag came together. From the initial brief and General Dixon's approval of the operation in July of 1975 to the beginning of the first exercise in November took just over four months. Suter took his brief back to Nellis Air Force Base to prepare the aggressors and weapons school members and to clearly articulate his concept to the men who would be asked to execute as the red air forces.

As Dixon stated, he was getting the necessary top cover and push from the Air Force Chief of Staff. General Brown extended this push for realistic training to other theaters as well. Although weather conditions on the Nellis Air Force Base's ranges were almost always ideal, General Brown indicated to the Tactical Air Command commander as well as the commanders of the Pacific and European Air Forces that bad weather would no longer hinder realistic training. In October 1975, General Brown told his warfighting commanders that air crews would be "required to deliver ordnance under conditions of relatively low ceilings and visibility," and requested "immediate introduction [of live munitions drops] into current training programs." While Brown certainly didn't intend for his subordinates to change the weather, he wanted to ensure the training at home station would mirror all manner of weather conditions faced in combat. Given the often poor weather in Vietnam, it is amazing that it took as long as it did for this to occur.[143]

At the same time, support for Red Flag was coming from all quarters. In a message to the Chief of Staff of the Air Force dated 1 October 1975, the Air Force's director of intelligence

[142] General Robert J. Dixon, Oral History Interview, Air Force Historical Research Agency, 18 July 1984, K239.0512-1591 C.I, 247.

[143] Tactical Air Command History, 1975, vol 3, Supporting documents, message from director of Air Force Intelligence to the chief of staff of the Air Force; message from the commander of Tactical Air Command to the chief of staff of the Air Force; message from the chief of staff of the Air Force to Air Force Systems Command.

informed the chief that a new reserve intelligence unit was being formed whose primary function would be support to Red Flag. Furthermore, the director of intelligence told General George Brown that certain Soviet assets would be moved to Nellis Air Force Base to serve as hands-on displays for Red Flag participants. While these assets included Soviet tanks and trucks, the director of intelligence requested a secured facility for two items that the Air Force was also close to obtaining: a MiG-17 and a MiG-21. General Dixon was courtesy copied on the message and immediately responded directly to the General Brown asking for aircraft mechanics in the hopes of making the MiGs flyable. Clearly, Dixon aspired to having his pilots fly the actual MiGs and not aircraft that only approximated MiGs. Another message, sent by General Dixon, in the broadly ranging correspondence among senior leaders as they attempted to get Red Flag off the ground went to the Air Force Systems Command. Dixon requested any other Soviet items to include everything from guns and ordnance to actual aircraft not being currently exploited to be shipped to the warfare center at Nellis Air Force Base. Dixon envisioned an area where pilots and intelligence officers could get, quite literally, hands-on with Soviet equipment. The area eventually became known as the "petting zoo."[144]

Almost every tactical engagement scenario taught during Red Flag was a direct descendant of a major problem faced during Vietnam. Air Force Brigadier General Robert Givens went so far as to say that "everything we did at Red Flag we did to fix a problem faced in Vietnam, and learning these hard lessons paid huge dividends in later conflicts." At Red Flag, the scenarios were not just about practicing basic fighter maneuvers and larger dogfights. Pilots

[144] Tactical Air Command History, 1975, vol 3, Supporting documents, message from director of Air Force Intelligence to the chief of staff of the Air Force; message from the commander of Tactical Air Command to the chief of staff of the Air Force; message from the chief of staff of the Air Force to Air Force Systems Command; Today the "petting zoo" is an unclassified facility. Anyone with access to Nellis AFB can visit the facility which includes many of the original training items: Soviet troop carriers, tanks, surface-to-air missiles, etc., the facility is also home to a MiG-23 and MiG-29 that visitors can climb into.

had to plan the mission from start to finish. They had to coordinate with other squadrons assigned to the same mission responsible for providing offensive counter-air or striking the actual target. In addition, they had to plan aerial refuelings into their missions. They were also briefed by intelligence officers on the enemy air threat. Everything about Red Flag was as real as the planners could make it. Over time and with each additional class, Red Flag became progressively more difficult and more complex with the addition of different aircraft and different coalition partners who were eager to participate.[145]

Red Flag I

Red Flag I began on 29 November 1975 and ended nearly a month later on 20 December 1975. Five units participated as "blue forces" with six different aircraft types functioning in various roles. The primary unit to be trained was the Forty-Ninth Tactical Fighter Wing from Holloman Air Force Base, New Mexico, which operated F-4D Phantoms. The Forty-Ninth Tactical Fighter Wing conducted air-to-ground training against a Soviet-style threat environment, which included SA-2, SA-3, and SA-7 surface-to-air missiles and anti-aircraft artillery batteries. The after-action report indicated that the most effective tactics used by the F-4s were high-speed, low-level passes while deploying chaff. This exercise demonstrated to the pilots of the Forty-Ninth Tactical Fighter Wing what worked and what didn't. Beyond the surface-to-air threat, the Sixty-Fourth Fighter Weapons School operated as the enemy, or "Red Air," during the exercise. The Sixty-Fourth Fighter Weapons School operated T-38s and F-5s and simulated Soviet tactics. This allowed the blue forces to experience the most realistic scenario outside of actual combat. Wild Weasel F-105s also participated, allowing the Forty-Ninth Tactical Fighter Wing to exercise the secondary role marked out for them – air-to-air

[145] Robert Givens, interview with author, 15 December 2011.

combat – in their designed operational capability statement. Throughout the four-week exercise, the Phantom pilots "lost" eight aircraft to the ground threat and eleven to the aggressors. In return, the red forces "lost" seven surface-to-air missile and anti-aircraft artillery sites, and five aggressors were "shot down." The final tally was 20 losses to blue forces and only 12 losses to the red force. Beyond the primary missions, air crews who were simulated as having been "shot down" were debriefed and then airlifted to a remote section of desert, where they had to escape and evade "enemy" forces while waiting for search and rescue helicopters. The search and rescue forces then had to ingress through the same air defense system that had shot down the fighter aircraft. This support and inclusion of the search and rescue forces sent a very strong message to the downed pilots: in training scenarios and in combat, if they were shot down, someone was going to make every possible attempt to come and retrieve them. This further heightened the pilot's understanding that even if rescue was coming it was going to be a very difficult operation. The inclusion of search and rescue operations further heightened what was already very realistic training.[146]

The tactics for evading enemy threats were also broken down in fuller analysis. Pilots who attempted only to "jink" out of the way lost 90% of the time. Those who relied solely on flares and chaff also lost 90% of the time. In later sorties, pilots learned to attempt avoidance maneuvers and employ countermeasures simultaneously, increasing their chance of survival by a further 30%.

In the final analysis of Red Flag I, the participating pilots rated how realistic the exercise was on a ten-point scale, with ten being actual combat. The exercise earned an average score higher than eight. Since some of the pilots participating in the exercise were Vietnam combat veterans, the high average score indicated to Suter and others on the Air Staff and at Tactical Air

[146] Air Combat Command History Files, Red Flag files, Red Flag I Final Report, 3-5

Command that for the concept of realistic training might very well be met by further Red Flags. As one participant succinctly stated in a phrase that General Dixon used in presentations to his peers to validate the program, "I thought I was back in Route Pack 6." After the success of Red Flag I, the Tactical Fighter Warfare Center started running Red Flags on a monthly basis.[147]

It did not take long to test the exercise again. Red Flag II took place starting on 17 January 1976. One of the primary missions practiced during Red Flag II was combat search and rescue. Those operations became a mainstay at Red Flag in the ensuing years. On any given morning during the mass morning brief that all pilots attended, one or two pilots would be asked to step from the room and were informed they had just been shot down. On more than one occasion, these same pilots had been "shot down" on the previous day's mission. They were then outfitted with all of their survival equipment and driven in or flown by helicopter to a remote desert site, where they had to then make contact with the rescue aircraft sent to pick them up.

A successful search and rescue mission proved difficult to accomplish even in the desert landscape of the Nellis Air Force ranges. One of the factors contributing to this difficulty was the downed pilots' unfamiliarity with the process and procedures for proper extraction. Most of the pilots did not know their own role in helping rescue crews to locate them. On one mission, a pilot even changed locations and failed to notify the rescue team, thus exposing the rescue helicopter to prolonged exposure to enemy fire. Combat search and rescue missions did not just entail a rescue helicopter flying to a certain location and picking up a downed pilot. Rescue operations, by their very nature, were very dangerous missions and extremely difficult to conduct. Two or more helicopters were accompanied by close air support and offensive fighters had to ingress into enemy territory to rescue the pilot. Even after the rescue team located the

[147] ACC, Tactical Air Command History, 1976, vol. 3, Supporting Documents on Red Flag Exercise

pilot, the downed airman needed to be "authenticated" to ensure that he was who he said he was and that the rescue was not flying into a well-orchestrated trap. During one of the practice missions, an F-100 pilot ejected from his aircraft after losing his flight controls. This became the first aircraft lost at Red Flag and offered the rescue crews the chance to ply their trade in a non-exercise role.[148]

The combat air patrols that provided cover fire during search and rescue missions were often set upon by the aggressors. By returning to base and debriefing with the aggressor pilots afterward, the combat air patrol pilots discovered real-world applicability and changed their tactics on the next mission. In that scenario, when the aggressors came calling again, the pilots flew in a circular pattern and separated 180 degrees from one another over the rescue helicopter, which was also called a tail chase or Lufberry Circle. By doing so and effectively covering the rescue operation and each other simultaneously, they prevented the aggressor from entering the area without exposing himself to one of the covering aircraft. The previous debrief, change in tactics, and successful completion of the mission provided an "aha" moment for the pilots and demonstrated the efficacy of the program on the tactical level. One of the participating pilots stated, "Red Flag is the most refreshing, exciting, and dynamic happening in [Tactical Air Command] in many years. What is happening is the line pilot is able to practice his tactics that he will use on the first day of combat. He doesn't have to wait until the heat of battle when the enemy is trying to kill him." Combat search and rescue missions would pay off enormously

[148] The Lufberry Circle dates to the First World War and has been used since that time as a defensive maneuver to prevent an enemy aircraft to engage a friendly aircraft without exposing himself to the other friendly aircraft. It is attributed to Raoul Lufberry of the Lafayette Escadrille and later 94th Aero Squadron; Air Combat Command, Red Flag Files, Red Flag II Final Report, 2-5.

during the 1990s. The above-mentioned change in tactics, in particular, was replicated on numerous occasions during Operation Allied Force in 1999.[149]

By the end of May 1976, the Tactical Fighter Weapons Center concluded Red Flag V, and "results…were exceeding our expectations." Each successive exercise had grown in size, scope, and number of participants. The Red Flags also trained the crews of the Air Force's newest fighter, the F-15. Colonel Larry Welch, the first commander of an operational F-15, recalled, "With General Dixon's encouragement, for a period of almost 15 months, we kept a detachment of F-15s at Red Flag to learn how to use the near-revolutionary capabilities of the that new aircraft in conjunction with other forces."[150]

Word of Red Flag spread like fire through the fighter community. The response to the operation by the participating crews was overwhelmingly positive. Pilots said the exercise was the "…most valuable training ever…" and the "…most realistic since actual combat." It didn't take long for the participating crews to ask the Red Flag controllers to ramp up the pressure on the blue forces, saying "…bring on more [surface-to-air missiles], aggressors and scenarios…." The Tactical Air Command commander and all of his pilots recognized the inherent merit in Red Flag, but Dixon wanted to ensure that even though the training was realistic, the pilots never let safety slip too far from their minds. "They knew they were getting training that they had never seen or done before. They knew the value of it. I left them with a message pinned to the wall down there and asked them to, for God's sake, be a little careful about this thing because a little misdirected enthusiasm would set us back 20 years." [151]

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[149] ACC, Tactical Air Command History, 1976, vol. 3, Supporting Documents on Red Flag Exercise
[150] General Larry Welch, "The TAC Flags Programs," Air Force Historical Research Agency, General Robert J. Dixon Files.
[151] Pamphlet on Red Flag Readiness Training, Air Combat Command History Files, Red Flag Files; General Robert J. Dixon, Oral History Interview, Air Force Historical Research Agency, 18 July 1984, K239.0512-1591 C.I, 248

In retirement, General Charles Horner, the man who led coalition air forces during Desert Storm, remembered an early Red Flag in which he led four F-4 Phantoms on a low-level penetration strike. As they entered into the "hostile" air space, threat emitters began tracking his formation and simulated surface-to-air missile rockets streaking into the sky. Flying at only 250 feet off the ground and at more than 500 miles an hour, Horner's wingman began rocking back and forth as he attempted to jink away from the simulated surface-to-air missile threat. Horner tersely informed his wingman to "knock it off," the universal pilot command to immediately stop what one is doing. At the afternoon debrief, Horner pulled the young pilot aside and asked why he had been maneuvering at such a low altitude. When the pilot informed Horner that he was avoiding the surface-to-air missiles, the combat veteran informed him that the chance of a surface-to-air missile striking the aircraft and killing him at that altitude was only about 10%, but if he hit the ground from evasive maneuvering and ended up "down in the dirt," the chance of death was 100%. The junior pilot learned his lesson from the experienced Vietnam veteran. If the situation were to occur in actual combat, the wingman was better prepared to face the realistic threat.[152]

Years later, Dixon described the enthusiasm for the operation this way:

> Red Flags caught on like wildfire. The crews loved them.…The Soviets criticized them. I was described in *Tass* or one of the other Soviet newspapers as an obvious warmonger who was preparing for a war, which seemed to me to be sort of a left-handed criticism in that that was what I was supposed to be doing; it was sort of a compliment to be criticized by the enemy for doing something, so obviously maybe I was doing it right.[153]

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[152] James Kitfield, *Prodigal Soldiers: How the Generation of Officers Born of Vietnam Revolutionized the American Style of War* (Washington D.C.: Potomac Books, 1997), 168.
[153] General Robert J. Dixon, Oral History Interview, Air Force Historical Research Agency, 18 July 1984, K239.0512-1591 C.I, 251.

Beyond Tactical Air Command, other commands, services, and international partners wanted to participate. Military Airlift Command and Strategic Air Command began sending representatives to Red Flag, and it wasn't long before officials in London sought entry for the Royal Air Force to participate as well in the exercise as well.

Strategic Air Command's first appearance came in April 1976, less than a year after Red Flag began. The bombers did not do well in their first excursion into the TAC-led exercise. Three B-52s took off from their home base, received the necessary aerial refueling, and then entered the training area. The B-52 pilots followed standard Strategic Air Command training methods and flew at high altitude in broad daylight. For miles behind each B-52 trailed a magnificent contrail, leading anyone within a fifty-mile radius right back to the aircraft. All three were shot down by the aggressors. At the later debrief, the flight lead was asked why on earth he would enter into hostile territory in such a ridiculous and blatantly obvious manner. The bomber pilot told the aggressors he was simply doing what he had been ordered to do by headquarters. As C.R. Anderegg put it, "It never occurred to him to change altitudes. He had been trained in the strategic bombing mentality, wherein the mission was planned at headquarters, and a good [Strategic Air Command] pilot would execute the plan perfectly." In Strategic Air Command obedience was preferred to thinking independently. The next time Strategic Air Command returned to Red Flag, the same thing occurred. It took several attempts before the bomber pilots realized that flying all the way to the Nellis Air Force Base ranges only to be immediately shot down was to waste an opportunity to train and learn something useful. It was also a complete waste of their time. Eventually, the bomber pilots learned that, to survive, they needed to brief with the friendly blue air and adjust their own tactics. Tactical Air

Command was suddenly enlightening Strategic Air Command-trained airmen how to do *their* job. Traditional air power theory was being turned upside down.[154]

Five years into the exercise, every type of combat, transport, and refueler aircraft participated in Red Flag on a regular basis. In two weeks in 1975, several dozen airmen experienced this new way of combat training. By the end of 1976, the number had increased to more than 2,000 in only one year. Another year saw that number triple. In its first five years of existence, Red Flag had trained more than 20,000 pilots, weapon system operators, navigators, soldiers, sailors, airmen, and marines, both enlisted personnel and officers. By 1987, Red Flag had grown to include eighteen participating foreign countries and fifteen international observers from five different continents, including participants as diverse as the United Kingdom, Turkey, Jordan, and Singapore.[155]

Dixon must have done something right, because he gained the attention of more than just the Soviet Union and of countries friendlier to the U.S. that wanted to participate in Red Flag. In January 1978, General Dixon received a letter from Senator Barry Goldwater telling the general that he had nominated Red Flag to receive the coveted Collier Trophy for the 1977 calendar year. The Collier Trophy was given annually to an individual or group that had made "the greatest achievement in aeronautics or astronautics in America, with respect to improving the performance, efficiency, and safety of air or space vehicles, the value of which has been thoroughly demonstrated." Red Flag went on to win the Collier Trophy that year. In his

[154] Anderegg, *Sierra Hotel*, 98; ACC, Red Flag Files, Red Flag Summaries, "Background Paper on SAC Conventional Operations in Red Flag Exercises, 1-2.
[155] Anderegg, *Sierra Hotel*, 97; ACC, Red Flag Files, Red Flag Summaries, 1987, 1-2, slides 19, 20.

acceptance speech for all the men and women of Red Flag, General Dixon said, "Red Flag grew out of a unique need…to squeeze all the combat capability possible out of what we have."[156]

Red Flag flourished and expanded during the 1980s. A typical Red Flag lasted two weeks. Each participating wing conducted five days of flying each week and two "goes," or missions, each day, one in the morning and one in the evening. If a pilot didn't fly in one of the sessions, he spent that time planning for a mission. All told, Red Flag allowed for roughly ten missions for every flyer, the desired end state. The first week's problems started small and got progressively harder each day. Initial missions were challenging but nothing compared to what came later. The scenarios typified problems likely to be faced in a generalized western European conflict. The simulated targets were based on realistic scenarios planned for in case of a war with the Soviet Union. Obviously, no one intended to shoot real missiles at the training forces and so surface-to-air missiles and anti-aircraft artillery, and ground control intercept sites needed to be simulated. To realistically simulate surface-to-air missiles and anti-aircraft artillery, threat emitters had to be acquired. In 1975 and 1976, with General Dixon's approval, Suter scoured the Air Force and had as much of the equipment as he could get his hands on sent to Nellis. By the end of the second week large formations of friendly attackers or "blue air" attempted to strike a heavily defended target surrounded by mock surface-to-air missiles and anti-aircraft artillery and to avoid the numerous enemy aggressors or "red air."

The Era of Bill Creech

General Dixon retired in 1978. He was replaced by a man who continued to expand upon the changes taking place in training. The continuity between Dixon's programs and Creech's were seamless. General Wilbur "Bill" Creech had already had a storied career by the time he took the

[156] Collier Trophy website; Collier Trophy Files, Air Force Historical Research Agency, K 417.298, folder 1.

reins of Tactical Air Command in May 1978. Creech was an early Air Force Thunderbird and former director of operations of the Fighter Weapons School at Nellis Air Force Base. He was a combat veteran with 177 missions flown during Vietnam. General Charles Sweeney, the man responsible for molding Tactical Air Command prior to the revolution in training, picked Creech to be his executive officer. Creech had also for a time served as an assistant on the staff of Robert McNamara. First and foremost, though, Bill Creech was a fighter pilot.[157]

It didn't take long for Creech to make fundamental changes inside Tactical Air Command that would have long-lasting reverberations throughout the Air Force long after his retirement. Outside the fighter community, Creech is best known for the two shades of brown that adorn every Air Force bases across the globe. While touring Tactical Air Command bases after taking command, Creech became angered at the indiscriminate colors of various buildings. Creech was, if nothing else, a stickler for order. He personally oversaw the development of two earth-tone browns that eventually coated every Air Force building. To this day, the colors are known collectively as "Creech Brown."[158]

However, it was Creech's changes within the fighter community that are still discussed in the Air Force today. First Creech set about improving the "utilization rate" of tactical fighter aircraft. The "ute rate" detailed just how often aircraft were flying in a particular squadron. Since 1969 the ute rate in tactical fighter squadrons had steadily declined from each aircraft averaging more than twenty sorties a month to only eleven. Creech wanted this number drastically increased. Creech recognized that in a combat situation fighters needed the ability to

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[157] James C. Slife, *Creech Blue: General Bill Creech and the Reformation of the Tactical Air Forces*, (Maxwell AFB, AL: Air University Press, 2008) 21

[158] Air Combat Command Files, Tactical Air Command Files, General Wilbur Creech Files. This file was moved to Creech Air Force Base in 2011 as part of a permanent display. The samples produced by the Sherman Williams company are currently being prepared for shipment to Creech Air Force Base as part of a display honoring the general. The paint swatches are considered one of the crown jewels of the display.

generate sorties time and again. Strategic Air Command was not as worried about an aircraft's generation rate since, in the event of nuclear war, the aircraft were not expected to make more than one flight. In the SAC community, war was a one way trip with no ticket home.[159]

To fix the sortie generation problem Creech initiated the "Robust Units program." This program not only filled each flying squadron to capacity with aircraft and air crews, it also realigned the maintenance squadrons. Creech was aware of an experimental program occurring at MacDill AFB called the "production oriented maintenance program." In this program, the maintenance organization was separated into three different squadrons, each one with a unique mission. These were the component-repair squadron, the equipment-maintenance squadron, and the aircraft-generation squadron; each aircraft generation squadron was further split into different aircraft maintenance units (AMUs) that correlated with the flying squadrons which allowed for maintenance personnel to work directly with the pilots who flew the aircraft they maintained. This was exactly opposite to how SAC organized their maintenance personnel. Creech applied this concept across the Tactical Air Command. As of 2013, maintenance squadrons in Air Combat Command continued to operate in this manner.[160]

Creech noticed that Red Flag's tactical answer to surface-to-air missiles was to fly as low and fast as possible and blow through the threat rings rather than destroy them. Creech called it the "go low" mentality. After reading an article in the newspaper on a Sunday morning about Red Flag in which a pilot stated, "I learned I can't survive in combat," Creech became furious. As Creech recalled, "I came up out of my seat! The problem wasn't that he thought that way; the problem was that he was exactly right *in* (emphasis in original) thinking that way. We were using tactics that weren't going to work." He wanted the problem addressed immediately, and that

[159] James C. Slife, *Creech Blue*, 83-87
[160] James C. Slife, *Creech Blue*, 83-87; General Wilbur Creech, Oral History Interview, Air Force Historical Research Agency, June 1992, 252-253

afternoon he instructed every Tactical Air Command wing commander to be at Langley Air Force Base by Tuesday morning. [161]

When the wing commanders, brigadier generals, and colonels met on that Tuesday morning, Creech encountered resistance among some of his wing commanders, but the general was undeterred. Creech decided that blowing past the surface-to-air missile threats in the future was not going to work, if for no other reason than the integrated defense systems were likely to be too prolific for this tactic to be sound. Creech told his assembled subordinates:

> We're going to dramatically change our approach, simply because it's wrong. We're now going to make defense roll back and taking the [surface-to-air missiles] out our first order of business. No more trying to fly past [surface-to-air missile] sites to get to other targets. That can't be done. Taking them out can be done, and it will be easy if we go about it right. We need to get up out of the weeds as soon as possible to avoid the anti-aircraft artillery, a far more formidable threat. We'll go on a full-court press to develop and field systems and munitions that fit our new tactics. Our fixation on low-altitude ingress, egress, and delivery and the systems and munitions that fit solely that approach is over.[162]

The "go low" mentality was permanently removed as a mandated tactic. Certain aircraft and mission sets still required going low, but it was never again the prescribed tactic for air-to-ground operations. Creech saw to it that surface-to-air missile rollback became an important part of future Red Flag exercises. Creech's solution for surface-to-air missile rollback and destruction of integrated air defense systems emphasized the use of EF-111s, F-15E air-to-ground strike fighters, and the still-classified F-117. The Wild Weasel mission was updated and

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[161] General Wilbur Creech, Oral History Interview, Air Force Historical Research Agency, June 1992, K239.0512-2050 C. I, 225.
[162] General Wilbur Creech, Oral History Interview, Air Force Historical Research Agency, June 1992, K239.0512-2050 C. I, 226.

expanded with the addition the DOC statements for these units to focus only on the suppression of air defenses. For the first time in the Air Force's history, the destruction of the air defense network became a prerequisite to an air campaign. This doctrinal change paid dividends when applied in Desert Storm.[163]

Creech designated Brigadier General Michael Loh as his briefer for this particular change in tactics. To ensure implementation, Loh traveled to each Tactical Air Command base to ensure that every fighter pilot -- active, guard, and reserve -- was aware of the change and the importance that Creech placed on it. Loh and his team traveled to the Europe and Pacific Air Forces as well and briefed on multiple occasions at the Pentagon. Creech took no chances. He wanted everyone involved in an air campaign from the most senior decision makers to the newest pilots to know that Tactical Air Command was changing the way it conducted warfare. The most important brief took place at Nellis Air Force Base. If destruction of integrated air defense systems was going to be a primary mission of the Air Force during a conflict, then it had to be instituted at Red Flag.

Instituting the change at Red Flag had far-reaching repercussions. The old way of doing business had treated surface-to-air missiles as an unstoppable threat to be bypassed as quickly as possible to improve survival rates. As Creech later said, "…in the Red Flag debriefings the pilots indeed learned that they could not survive in combat. We changed that thinking to where they came away with the view that it was the other side that was going to have trouble surviving in combat!" Surface-to-air missiles and their ground control stations went from something to be avoided to something to be destroyed early on. Remove the missile threat, and Red Flag forces could operate with impunity against ground targets. Having specialized aircraft to go after the

[163] General Wilbur Creech, Oral History Interview, Air Force Historical Research Agency, June 1992, K239.0512-2050 C. I, 225.

surface-to-air missiles also immediately freed up the air-to-air fighters, which could then focus on destroying the aggressors rather than on avoiding surface-to-air missiles.[164]

Creech's focus also added another important element to the Red Flag scenarios, the single air component commander. At Red Flag events, this position was called the "blue forces command element," and the commander and his staff monitored the conflict and practiced command and control. The commander oversaw all aspects of the air effort and controlled each blue force fighter, even if there was Navy or international participation. The blue force commander saw no difference between a Navy F-14 accomplishing a particular mission or an Air Force F-15. To the blue force commander, air power was air power, regardless of service affiliation. One of the blue force commanders in the 1980s was Brigadier General Charles Horner, who took his Red Flag lessons with him to Desert Storm as the Joint Force Air Component Commander during that operation. Desert Storm was the first instance since the oft-referenced Battle of Saint-Mihiel in World War I at which all tactical-level assets, regardless of service or country, fell under a single air commander for operations.

Creech's overall impact cannot be overstated. Tactical doctrinal changes, more flying hours for pilots (which directly impacted time spent in training), and improvements to Red Flag were all hallmarks of Creech's tenure as Tactical Air Command commander. Creech did not accomplish these changes single-handedly, but his leadership and desire for improvements to Tactical Air Command had far-reaching effects. The Chief of Staff of the Air Force at the time, General Lew Allen Jr., stated in his official exit interview upon his retirement in 1986 that "under Creech's leadership…fundamental reorganizations were under way, which contributed to combat capability and to improvements in attitudes." Many thought that Creech was destined to be the next chief of staff, but he retired when his tenure at Tactical Air Command ended. Creech

[164] General Wilbur Creech, Oral History Interview, Air Force Historical Research Agency, June 1992, 225.

himself pointed to two primary reasons why he was not promoted to a higher position. The first, and most honest, answer was that he simply had no desire to move to Washington, D.C. As he later said:

> I simply had no appetite for that job, and my reasons had to do with Washington dynamics versus field command dynamics. I thought other good people could do the chief of staff job as well or better than I could. I wanted to finish what I had started with the TAF (tactical air forces) rather than [get] bogged down in Washington where the urgent is confused with the important. [165]

The second reason stemmed from disagreements with the Secretary of the Air Force, Verne Orr. Creech's and Secretary of the Air Force Orr's visions of the force structure were at odds. Creech was an advocate of the F-117, while Orr was not. Creech opposed the views of a group of Pentagon insiders led by Colonel John Boyd who called themselves the "the reformers." Creech opposed the reformers desire to purchase updated versions of the F-5 and F-20 in bulk in lieu of purchasing F-15s. Orr endorsed that proposal.[166]

Red Flag Expands

The 1980s saw continued growth of Red Flag and expansion of its mission. As the operation grew, so too did its impact on tactical-level fighter squadrons that wanted to participate. Every unit with a designed operational capability statement wanted to participate to test out its piece of an air campaign. In 1982, electronic warfare units began attending to practice radar jamming and other non-lethal suppression methods. The year 1982 also saw a Red

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[165] General Lew Allen, Jr., Oral History Interview, Air Force Historical Research Agency, January 1986, K239.0512-1694 C.I, 140; General Wilbur Creech, Oral History Interview, Air Force Historical Research Agency, K239.0512-2050 C.1, 231.

[166] General Wilbur Creech, Oral History Interview, Air Force Historical Research Agency, K239.0512-2050 C.1, 231, 232

Flag focused exclusively on attack aircraft and the close air support mission. Although many criticized the Air Force for its lackadaisical attitude toward the A-10, beginning with Red Flag 83-1 (i.e. the first Red Flag held in fiscal year 1983), TAC made a CAS squadron the primary unit for that exercise. TAC also ensured that at least one Red Flag exercise every year focused on the CAS mission. This suggests that the Air Force took the close air support mission seriously. The 83-1 exercise focused on joint air attack tactics in conjunction with the Army. In this particular scenario, U.S. Marine Corps units from the 2nd Forward Air Defense Battery composed part of the ground threat and used Stinger surface-to-air missiles to attack the low and slow A-10s and OV-10s. [167]

The year 1984 saw the introduction of dedicated forces for the suppression of enemy air defenses. The mission to suppress enemy air defenses was an important direct response to the Warsaw Pact countries' proliferation of air defense systems. Red Flag planners set about teaching pilots how to systematically dismantle this threat as a precondition to further operations. During the first week of a Red Flag exercise, the number of surface-to-air threats was intentionally reduced to an artificially low level to give air crews some level of comfort in working in a low-to-medium threat environment. During the first week, the surface-to-air threats did not experience any attrition. However, during the second week when the surface-to-air threat was higher, battle damage assessment was done to remove the "destroyed" surface-to-air missile sites. By the end of the second week, then, the surface-to-air threat was typically reduced to a lower level than the low-to-medium risk levels of the first week. Pilots readily internalized that

[167] ACC, Red Flag Files, Red Flag Summaries, 1987, 1-2, slides 19, 20; ACC, Red Flag Files, Red Flag Summaries, RF-83-1, 1.

destruction of the enemy air defense system made them safer, and they also learned that they had the power to diminish threats to reasonable levels.[168]

Following the simulation of a campaign to suppress enemy air defenses, other missions could strike deeper into "enemy" territory, including strikes against airfields and interdiction. Perhaps without realizing it, Red Flag planners were systematically building and executing a workable air campaign to be used in combat. It was a plan in which tactical aircraft performed missions they had never accomplished before: suppression of enemy air defenses followed by deep attack and offensive counter-air operations. Tactical fighter aircraft with limited support from assets of the Strategic Air Command could systematically destroy any adversary's air defense system or air force, and then strike at targets deep within an enemy's interior lines. The framework of Red Flag could be taken and integrated into any operational plan. Red Flag changed the Air Force's way of war, although most probably didn't recognize it at the time. In essence, this was the development of a new aerial warfare strategy, one in which tactical fighters were the primary fighting force capable of achieving results that would have been impossible for those aircraft types a generation earlier.[169]

By the mid-1980s, Red Flag was training thousands of flyers and support personnel on an annual basis. In one exercise in late 1983, the participants came from Tactical Air Command, Strategic Air Command, Military Airlift Command, Marine Corps, Navy, Air Force Reserve, Air National Guard, and Republic of Korea Air Force. The list went on and on. Not only did the Air

[168] Air Combat Command, Red Flag Files, Red Flag Summary Reports, RF-84-1, 1; Air Combat Command, Red Flag Files, Red Flag Summary Reports, RF-84-2, 9.
[169] Air Combat Command, Red Flag Files, Red Flag Summary Reports, RF-84-1, 1; Air Combat Command, Red Flag Files, Red Flag Summary Reports, RF-84-2, 9.

Force benefit from the realism achieved on the Nellis Air Force Base ranges, but air forces the world over wanted to be a part of what was happening in the Nevada desert.[170]

The true learning at Red Flag took place after the mock combat ended. After every mission, a debriefing occurred. Each aircraft at Red Flag carried an air combat maneuvering instrumentation (ACMI) pod. The ACMI pod fed back into the Red Flag mission debriefing system (RFMDS). F-16 fighter pilot Colonel Dan Hampton said that the RFMDS was "tremendous advantage," and that "All maneuvers, tactics, and every weapon that is dropped or shot is analyzed. This is how we learn, evaluate, and this is another reason for American air supremacy." In this debrief, the mission planner, flight lead, and each participant discussed what went right and what went wrong. The training environment at Red Flag also allowed pilots to be debriefed by the "enemy." The aggressors attended each debrief and likewise discussed their successes and failures on each mission. Pilots learned from their mistakes. General Dixon had said in an interview, "Air crews are being given a chance to try their ideas, to fly missions the way the war should be fought, and to learn from their own mistakes…men learn a lot more from mistakes than they do from rhetoric."[171]

There were other lessons learned at Red Flag that proved to be important--the need for timely take-offs to ensure attack packages could refuel and rendezvous on time, the importance of a mission commander knowing the capabilities of all aircraft in his strike package and not just his own, the importance of face-to-face coordination between planning elements, and the importance of addressing conflicts in terminology used by different commands. The last one would momentarily wreak havoc on a rescue mission in 1999 during Operation Allied Force.[172]

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[170] ACC, Red Flag Files, Red Flag Summaries, 1987, 1-2, slides 19, 20
[171] Dixon quoted in Anderegg, *Sierra Hotel,* 97, Dan Hampton, *Viper Pilot: A Memoir of Air Combat* (New York, NY: Harper Collins Publishers,2012),138-139.
[172] Air Combat Command, Red Flag Files, Red Flag Summary Reports, RF-84-2, 10.

The more Red Flag grew, the more realistic it became. It provided nearly real-time changes in tactics and strategies used to defeat the enemy, whoever that enemy might be. Red Flag grew to simulate an actual air war. In the scenarios in which they participated, air crews faced simulated enemies whose performance very well anticipated what happened in actual combat in the 1990s. As one flyer stated, "From reading the ATO [air tasking order], to interacting with intelligence and planning cells, to discussions with senior mentors, Red Flag made our joint and international air force more lethal and more flexible in combat. Even though no one was shooting live weapons…it was very realistic." This particular flyer, Captain Cesar Rodriguez, who later became a colonel, would end his career credited with three MiG kills, more than anyone else on active duty at the time. Perhaps he put it best when he emphatically stated, "The Red Flag experience prepared me for combat operations."[173]

By the late 1980s, a two-week Red Flag was a full-on air campaign with tactical fighters and fighter bombers destroying air defenses, ground control stations, and other target sets. It was unrecognizable against the Red Flags from the 1970s, at which one squadron participated and executed its designed operational capability statement. It was not a stretch to imagine the same tactical assets attacking strategic targets in any Warsaw-pact country or Soviet-armed enemy. The second week of the exercise was by far the most difficult. The morning began with a mass brief. Pilots then broke out to brief about their particular missions and stepped to their aircraft. After takeoff they joined with the rest of their mission package, the completed strike force would meet up with aerial refueling tankers, top off their fuel load, and ingress into the Nellis Air Force

[173] Cesar Rodriguez, email with author, 29 November 2011.

Base training ranges to begin the battle, being careful to avoid Area 51 right in the middle of the range.[174]

The overall mission, typically based against a Soviet scenario, began with the Vietnam-era F-4 Wild Weasels and later F-15Es or F-16CJs, supported by EF-111 electronic jammers, attacking surface-to-air missile sites as part of a suppression of enemy air defense attack. Colonel Dan Hampton said the threat array of simulated surface-to-air missiles in the Nellis ranges were "infamous for their lethality." Once the surface-to-air missile threat had been reduced, the F-15As flew into the teeth of the waiting aggressors as an offensive counter-air sweep looking to shoot down the enemy aircraft.[175]

In a typical scenario, a group of four F-15s, called a "four-ship" raced across the Nevada desert looking for the enemy aggressors. Behind the combat air patrol flew strike aircraft and other support elements. The aircraft flew in a "wall formation" abreast of each other, separated by a few nautical miles; this created a very effective barrier and equated to the aforementioned wall of aircraft. Years of Red Flag scenarios had taught that the wall formation was preferable to the welded wingman concepts flown during Vietnam. The F-15s' powerful radar often found the aggressors, F-5s, or newer F-16s first. Tactical employment began immediately. The first step for the flight lead when the radars detected a contact was to ensure that those contacts were indeed red air and not part of a blue air strike group. There were a few ways to identify an enemy. The orbiting friendly airborne warning and control system could "declare" an enemy contact, giving the American fighters permission to engage, or they could be visually identified. One unique way to visually identify an aircraft was the short-lived "eagle eye" program. The eagle eye was a rifle scope mounted next to the heads-up display and set along the aircraft's

[174] Lieutenant Colonel Steven Ankerstar, interview with author, 15 December 2011; Brigadier General Matthew H. Molloy, email with author, 13 December 2011.
[175] Dan Hampton, Viper Pilot, 138

horizontal axis, or "whiskey line," which was represented by a W on the heads-up display. If the radar-acquired target was aligned with the whiskey line, then theoretically the pilot could look through the scope and gain a positive visual identification farther out. Obviously, in an aircraft traveling at a few hundred miles an hour in a formation, it was a less than optimal solution that was soon, as Brigadier Matthew Molloy stated in 2011, "relegated to the rubbish bin of history."[176]

Upon confirmation of the presence of enemy aircraft, the four-ship of F-15s separated into two mutually supporting flights of two and "out bracketed" the enemy red air fighters. In other words, the flights flew away from each other but then turned back into the threat so that both flights pointed at the enemy formation. At this point, the fighters remained well outside visual range. The pilots selected AIM-7 radar-guided missiles. The flight lead assigned each aircraft a target. At roughly fourteen nautical miles' separation from the approaching enemy, the aircraft would lock onto their targets. Each aircraft would then "fire" a missile. Ground controllers back at Nellis would state "Copy Shot," the exercise answer that a missile had left the rails. The pilots then maneuvered and slowed their aircraft to put time and distance between them and their target and control the speed of the engagement. This slowdown allowed the pilots to switch from the AIM-7 to the heat-seeking AIM-9 with a simple flip of a switch on the throttle in the pilot's left hand, a vast improvement over having to reach for the selector switch in the early F-4s. Since the AIM-7 was a radar-guided missile, the F-15's radar remained locked onto the enemy, which allowed the missile to track to the target. [177]

Moments later, the F-15 flight lead called "power go heads-up display," which signaled to the other flyers in the flight to initiate the infrared missile defense. After the F-15s fired the

[176] Brigadier General Matthew H. Molloy, email with author, 13 December 2011.
[177] Brigadier General Matthew H. Molloy, email with author, 13 December 2011.

initial volley of missiles, it was unlikely that the aggressors remained ignorant of the fighters' presence and were racing to engage the fighters with simulated heat-seeking Soviet Vympel missiles. The move to infrared missile defense cooled the F-15s' engines, which presented less of a heat signature for the aggressor missiles to track. At this point, the simulated AIM-7s began finding their targets, and some aggressors were declared dead by the exercise controllers and turned to exit the area. However, not all missiles hit their intended targets, and the red and the blue air forces now pointed directly at each other and continued the engagement. The F-15 flight lead called for pure pursuit. If possible, the separated flights had by now closed near each other with the enemy aggressors only pointed at one set of the separated formation. This set would merge with the enemy, and rather than attempt to start a turning battle with the smaller F-16s, the fighters would blow through and make a call to the fellow airmen that they were exiting the area. The enemy began to turn in an attempt to get a missile shot, but the other set of F-15s performing mutual assistance was already in a position to kill any remaining aggressors.[178]

An F-15 or F-16 that was "shot down" either returned to Nellis AFB as part of "real time kill removal" or stayed in the fight and his mistakes evaluated at the after action debrief. Any aggressor aircraft that was shot down simply returned to one of three "enemy" airfields in western part of the Nellis range. Flying over these pre-determined areas, the aggressor aircraft immediately "regenerated" and returned to the fight. This simulated the Soviets superiority in numbers and allowed ten aircraft to replicate an entire Soviet sized squadron.

Pilots learned that the best engagements were those that did not result in a classic dogfight. It was far better to engage with missiles from a distance and maneuver for superior firing position. If the merge with the enemy did occur, it was better to "blow through" the merge and allow another pilot in a better position to take the shot. As one fighter pilot put it, "I'd much

[178] Brigadier General Matthew H. Molloy, email with author, 13 December 2011

rather shoot a guy at a distance than climb into a phone booth with him and have a knife fight." Still, the skills American pilots learned at the Fighter Weapons School or at their home stations as part of continuation training made them proficient at the close-in battle as well. When it came to meeting the enemy at the merge, many fighter pilots could not resist the urge to turn with the enemy in an effort to prove who the better pilot was. All too often, this was a mistake against the smaller F-16 aggressor aircraft, a lesson that was driven home at the afternoon debrief session where the pilots had to stand in front of each other and meticulously recreate the battle.[179]

The fighters also learned how to react if the aggressors were lucky enough to get the jump on them and begin the engagement by locking their own radar on the blue air fighters. Audible indicators, a warning tone specific to each aircraft's avionics, notified the pilots were that they had been "spiked" or were being tracked by the aggressor's radar. To defeat an aggressor's missile shot, the fighter would "notch," or conduct a beam maneuver that turned the aircraft perpendicular to the enemy, and at the same time defeat the enemy's radar return. It might seem conventionally wrong to present a side view of the aircraft, but the maneuver was meant to put the aircraft parallel with the surface of the earth. Approaching radar waves were unable to distinguish between the aircraft and the ground.[180]

The training provided by Red Flag was invaluable and paid dividends in later conflicts, especially during operation Desert Storm. As historian Williamson Murray later noted, "Red Flag taught a whole generation of air force pilots and commanders how to deal with enemy defensive systems from fighters to SAMs and AAA, as well as how to get bombs on target. It

[179] Lieutenant Colonel Steven Ankerstar, interview with author, 15 December 2011; Brigadier General Matthew H. Molloy, email with author, 13 December 2011
[180] Gaillard Peck, *America's Secret MiGs*, 105; Lieutenant Colonel Steven Ankerstar, interview with author, 15 December 2011; Brigadier General Matthew H. Molloy, email with author, 13 December 2011

was in the hard-to-measure areas of training and preparation for countering threats that Coalition air powers, especially Americans, enjoyed enormous advantages over their Iraqi opponents."[181]

The success of Red Flag spawned numerous other "flag" exercises in its immediate wake. When General Dixon was still commanding Tactical Air Command, the training revolution accelerated to train not only flight crews, but also intelligence, maintainers, and the plethora of other support functions that the Air Force needed to go to war. To Dixon, no aspect of his command and no Air Force specialist could avoid preparing for the next war. Following in the wake of Red Flag, other exercises started, all bearing Tactical Air Command's "flag" designator. Maple Flag, conducted in Canada, was similar to Red Flag but resembled the European theater of operations topography more accurately and included the participation of Canada and Great Britain's Royal Air Force.[182]

After Maple Flag, Dixon turned his attention away from flags centered on tactical employment. Blue Flag tested the operational-level war planners' ability to execute a war plan. Blue Flag's purpose was to link the tactical-level exercise of Red Flag with a command center for operational air plans. Blue Flag planners conducted intelligence preparation of the battlefield, created campaign air attack plans, and drew up simulated target lists. These targets were then passed to the incoming wing for the next Red Flag. Black Flag trained aircraft maintainers, and, finally, Checkered Flag familiarized other non-operational units with a wartime deployment. Pacific Air Forces started its own version of Red Flag, which was named Cope Thunder. These are but five of the eighteen exercises born out of the original Red Flag. [183]

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[181] Williamson Murray, *Air War in the Persian Gulf*, 78
[182] A complete list of USAF "Flag" exercises can be found in appendix A
[183] General Larry Welch, "The TAC Flags Programs," Air Force Historical Research Agency, General Robert J. Dixon Files.

Dixon's successor, General Wilbur Creech, continued to expand tactical- and operational-level "flag" exercises. By the end of the 1980s, more than eleven different flag operations had been conducted; more would be added in the 1990s. Red Flag remains the longest serving of these, and it is still conducted in 2013. Some exercises ran a relatively short time, only a few years. Still, as one exercise ended, another would take its place. More than twenty different Tactical Air Command, and later Air Combat Command, tactical exercises have trained millions of service members since the first Red Flag in 1975.

Despite all the accolades from the pilots who flew at Red Flag in the 1970s and throughout the 1980s, and despite official recognition in awards, the single greatest thing that could be said of the operation was that, as combat training, it worked. When the Air Force went to war on a large scale in 1991, most of the fighter pilots, and quite probably all of the flight leads of the tactical aircraft, had been to one Red Flag, if not more. Each of the fighter pilots who scored air-to-air kills had attended multiple Red Flag exercises. Captain Cesar Rodriguez, estimated that he had attended at least five Red Flag events in addition to Cope Thunder exercises in the Pacific. He would later say of his two MiG kills during Desert Storm that "they were exactly like the training missions I flew at Red Flag and at [my] home station as part of continuation training."[184]

Still, Red Flag was an exercise and not combat. Even if the Nellis Air Force Base ranges were the "largest, most sophisticated simulated battlefield on the planet," the exercise was still simulated. Red Flag was not real. It was, in the end, only an exercise. One veteran of Vietnam described the exercise in the following way: "To a point it was realistic training in that it was a real challenge for an inexperienced guy, and to that end it worked. But there is no substitute for getting shot at with real bullets." It was the best simulation possible, but still a simulation. The

[184] Cesar Rodriguez, email with author, 29 November 2011.

only way to gauge whether Red Flag and other flag exercises truly worked, and to know whether the exercise successfully simulated the first ten combat missions, was through the crucible of actual combat.[185]

The early 1980s saw the threat of a confrontation with the Soviet Union diminish. In 1981, the Air Force published a planning document meant to detail the direction in which the Air Force could be expected to go in the next twenty years, titled "Air Power Entering the 21st Century." The first assumption made in the report was that "there will be in the next two decades no general war. We expect there to be no conflict involving catastrophic engagements among superpowers or major powers." While not ruling out another proxy war, the publication noted that the destruction posed by direct confrontation would be "incalculable…and thus it is not useful to consider…." Even though direct confrontation with the Soviets seemed less likely this did mean Red Flag and other exercises were not needed. Any confrontation that did come would undoubtedly come against the massive amount of aircraft and surface-to-air missile systems the Soviets proliferated around the globe.[186]

This same report stated the need for advanced fighters that could conduct operations beyond visual range and in the close-in turning realm as well. The Air Force was already looking beyond the F-15 and F-16 for the next generation of aircraft procurement expected at the turn of the century. The Air Force prepared to move forward with a force posture of fighter aircraft that could, where practical, take over the bombers' mission. These included FB-111s and later F-15E and F-16CJs. These fighter variants were designed and fitted for specific and precise air-to-ground purposes. The importance of training was highlighted again. "Despite all the technical innovations…training will continue to be the key to combat capability. Realistic

[185] Jon Goldenbaum, email with author, 17 October 2011; Kitfield, *Prodigal Soldiers*, 167.
[186] "Air Power Entering the 21st century: An Air Force Report," 1FW archives, 2.

training will be critical," and "…training must be conducted under the conditions expected in combat." The bomber force, outside of nuclear delivery, was best suited for "support" where tactical fighters with refueling support were not available and to "augment the firepower of U.S. fighters." Even as early as 1981, when the Soviet Union remained a potent threat, the bomber community was relegated to being a force that provided back-up for the tactical fighters.[187]

Into the 1980s, as the Soviet threat diminished, military leaders began to seriously focus their attentions for the first time in decades on theaters other than Eastern Europe. The Iran Hostage Crisis and Soviet invasion of Afghanistan (as well as the perception that the Soviet Union might press its invasion into Iran) focused American attention on the Middle East and South Asia. However, even if conflict against the Soviet Union was looking less and less likely, when conflict did inevitably come, it would come against Soviet equipment and tactics. In 1980, an exercise of enormous proportions began between the U.S. government and the government of Egypt. "Bright Star," as it was known, was a way to test coalition warfare for the Central Command at the operational and strategic levels in a desert environment. Begun as just an exercise for each country's ground armies, it quickly expanded in the mid-1980s to include air and sea power as well. As far as the Air Force was concerned, Bright Star was no substitute for Red Flag, but it demonstrated that as the Cold War slowly transformed and tensions eased with the Soviet Union, American military leaders began to take a possible Middle Eastern conflict more seriously. The U.S. functioned as an arms supplier for many years in the region. As America's allies in the region began to fall, first in Iran, it was apparent that the U.S. government would take whatever steps necessary to ensure that America's interest in the region remained secure.

[187] "Air Power Entering the 21st century: An Air Force Report," 1FW archives, 39-42.

During the 1980s, the United States' and Egypt's militaries conducted dozens of Bright Star exercises. At the same time, across the Red Sea, Iraq was locked in an eight-year conflict with Iran. As that war ended, the riches that Saddam Hussein had spilled in that war needed to be replenished. Saddam believed that no other county, America in particular, had any interest in becoming involved in a dispute among Arab countries. Therefore, he turned his attention to his southern neighbor, the diminutive and oil-rich nation of Kuwait as a way to territorially and economically expand his dominance in the region.

Saddam's ill-conceived incursion into Kuwait was one which the American tactical fighter force well suited to rollback. Iraq's French-built and Soviet-styled integrated air defense network precluded the use of heavy bombers in many locations. The only way to take down the network and gain air superiority as a precursor to a land campaign was to have tactical fighters do the mission. It was a mission for which Air Force pilots had trained many times in the skies over the Nellis Air Force Base ranges. Red Flag proved to be one of the single most important creations born out of the defeat of Vietnam. Had it not been for Red Flag and other exercises, not to mention the Navy's own weapons school, allied air forces in Desert Storm might not have achieved the level of success that they did as quickly as they did. For fifteen years, Air Force pilots had trained again and again as a tactical force to defeat the enemy. When the word was given to deploy to the Middle East, the pilots were better prepared than their predecessors had been going to Vietnam. From that perspective, Red Flag had succeeded in preparing pilots for combat.

CHAPTER 4 - Setting the Stage:

Impact of New Aircraft on Training

As the training revolution was beginning, the Air Force was procuring new aircraft and systems with special new technologies. The new technologies forced the training exercises to become even more realistic and increase the threat levels to keep pace with advancements in the aircraft. As soon as new aircraft were declared "operationally capable," they were deployed to Nellis for inclusion in training events. This served a twofold purpose. First, it exposed other pilots to the capabilities of new aircraft. Second, and more important, it put new aircraft in realistic training scenarios test and helped discover what tactics made most sense with the new aircraft. As new aircraft rolled off assembly lines a certain number were sent directly to testing and evaluation squadrons and to the weapons schools to improve upon the existing knowledge of how the aircraft operated. The development of new technologically advanced fighters was an important step towards preparing the force for possible future combats, and these new fighters presented opportunities for improving the ongoing training revolution. The linkage of the new technologies with the reform taking place in training changed the way the Air Force conducted war. Air power historian Donald Mrozek once stated:

> Although organizations might build weapons, how could one guarantee that these weapons would be used coherently and purposefully? The focus on things—to the extent that it becomes a matter of creating a product and developing inventories in the form of

force structure—can become an obsession with management, at the expense of leadership and operational art. [188]

After Vietnam, the Air Force procured numerous aircraft in order to meet specific needs in force structure. Some of these were commonsense purchases done to replace an aging fleet or to maintain a needed advantage, such as having a new air superiority fighter. One development in particular applied new technology to the growing battlefield challenge of defeating Warsaw Pact air defense systems – the stealth fighter -- although very few members of the Air Force knew it was being developed. Finally, some purchases were made because they fit nicely with preconceived traditional notions of how air power should be employed.

The force structure that developed between 1975 and 1990 proved to be better suited for tactical applications on the battlefield than to other missions. The E-3 Airborne Warning and Control System (AWACS), the F-15, the F-16, and the A-10, in addition to advancements in precision guided munitions and precision delivery methods, all came to fruition at roughly the same time. Aircraft, missiles, and other technologies were all deployed to the proving ground at Red Flag and the Fighter Weapons School to test their combat capability. These training venues allowed Air Force pilots to integrate new aircraft and technologies into realistic training scenarios and better prepared pilots of these new aircraft for combat.

Throughout the decade after the Vietnam War, the Air Force brought newly designed aircraft to operational readiness, demonstrating new and advanced technologies, including powerful radars and other electronic components. These new technologies would later be credited with the successes of air warfare in the 1990s, but these new technologies were first tested in training environments long before they saw actual combat.

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[188] Donald J. Mrozek, "In Search of the Unicorn: Military Innovation and the American Temperament," *Air University Review*, XXXVII, no.6 (1986): 28-45. http://www.airpower.au.af.mil/airchronicles/AURIndex.html#M

The acquisition of aircraft is a process that often takes more than a decade before an aircraft is declared operationally capable. It is not possible to link use of air power in Vietnam with the creation of any one aircraft. In fact, it would be closer to reality to say that new systems were created despite the conflict in Southeast Asia. As an example, the Air Force's F-15, the first of the advanced fighters of the time, first appeared in the late 1960s, which means that it had been designed and approved for development well before Vietnam demonstrated the need for an air superiority fighter, something the Air Force had lost sight of during the creation of the Century Series.[189]

The training revolution occurred at the same time the Air Force was reevaluating its roles and missions. Training exercises in the Air Force provided a catalyst for development and change in roles and missions as new aircraft came online. As mentioned in the previous chapter, each Red Flag exercise expanded on the knowledge of each aircraft and each mission type. The Red Flag exercises allowed new aircraft to be immediately inserted into realistic scenarios. New tactical aircraft coming online at this time included the F-15, F-16, and A-10, as well as the Navy's fleet defense F-14. A 1974 Brookings Institution report titled *U.S. Tactical Air Forces: Missions, Forces, and Costs* asked two important questions: first, "What should U.S. tactical air forces do and in what order?" and, second, "What kinds of aircraft should be procured to do these things?" By 1974, the question of what kinds of aircraft should be procured had already been answered, but it was the realistic training exercises that helped to show what should U.S. tactical air forces do and in what order. The 1970s showed the Air Force, especially the Tactical Air Command, willing to reevaluate its preconceived notions of air power while at the same time

[189] Air Force Historical Studies Office, "The F-15 Eagle: Origins and Development, 1964-1972," Nov 1974,

holding on to its core principles. The operators of new combat aircraft used the ensuing decade to alter the way TAC trained for war. [190]

The Close Air Support Debate and the A-10

One of the most contentious issues that came forth from Vietnam was the Air Force's perceived lack of interest in performing close air support. The Air Force was able to overcome this perception by dedicating entire training exercises to the CAS mission and inviting Marine Corps and Army units to participate. Arguments that the Air Force's interest in a dedicated close air support aircraft came about only after the Vietnam War ended are not true. The Air Force was already looking into the design of a close air support platform beginning in 1966 and requested proposals from manufacturing companies the next year. However, it wasn't until 1970, when the Air Force may have been spurred by the Army's interest in a close air support attack helicopter, that the "A-X" program gained momentum. There was a real fear inside the Air Force that the Army would attempt to usurp the entire close air support mission, even after the 1966 Johnson-McConnell Agreement when the Army gave up fixed wing aircraft.[191]

In a 1970 letter to Chief of Staff John Ryan, Tactical Air Command Commander William Momyer said: "I must conclude that we will never be able to satisfy the Army on close support no matter what we build to do the job." Momyer went on to state that, if the Air Force went forward with plans to build an aircraft with the sole mission of close air support, the Army would argue that it should be assigned the aircraft, which would essentially be a flying artillery piece

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[190] William D. White, *U.S. Tactical Air Forces: Missions, Forces, and Costs* (Washington, D.C.: Brookings Institution, 1974), 1-2, 101.

[191] Richard D. Newton, "A Question of Doctrine," *Airpower Journal*, Vol II, No. 3, Fall 1998, retrieved on 12 Mar 13: http://www.airpower.au.af.mil/airchronicles/apj/apj88/fal88/newton.html, The Johnson-McConnell Agreement was more concerned with aircraft than with particular roles and missions so although the Air Force owned the fixed-wing aircraft there was a fear that the U.S. Army would build rotary wing attack helicopters to use as CAS platforms. The U.S. Army did in fact build different attack helicopters (AH-1, AH-64) but this did not obviate the need for the Air Force to provide a fixed wing CAS platform.

and should be organic to the troops in contact on the ground, much the same way the Marine Corps traditionally treated all of its tactical aircraft. Momyer believed that a CAS aircraft could also perform other missions and should have remained with the Air Force. He concluded: "The A-X concept won't sustain these arguments." Ryan added a handwritten addition at the bottom of his typed response: "I realize the dangers of a dedicated a/c [aircraft] for the Army support, but I think there are other overriding considerations." Ryan knew that the Air Force needed the A-X and he moved forward with plans to build a dedicated attack aircraft to provide close air support for the Army.[192]

The A-X program led to the development of the Republic Fairchild A-10 (beating the Northrop A-9) as the first Air Force platform designed exclusively for close air support. The A-10s distinctive feature was that it flew low and slow, carried 16,000 pounds of munitions, and provided psychological reassurance to ground forces. The A-10 was not a technologically advanced aircraft, nor a particularly attractive one, at least from the perspective of many fighter pilots who preferred streamlined and powerful craft. The A-10's nickname among pilots was the "warthog" and the name stuck even though the Air Force officially continued to use the name "Thunderbolt." Developed at the same time as the F-15 was nearing production and as the advanced fighter program (later F-16) was in development, the A-10 did not rely on advanced avionics or flight control systems. In fact, the urban legend that the aircraft was designed around the gun was entirely true. The 30 mm GAU-8 heavy cannon was the centerpiece of design considerations. The A-10 was also meant to be survivable at the low speeds and altitudes at which it was required to conduct its missions. The A-10 was therefore heavily armored. A-10 pilot Lieutenant Colonel Chris Haave said the "A-10 pilot training and weapons loads

[192] General John Ryan Files, Air Force Historical Research Agency, 168.7085, folder 61.

were optimized for daytime, low-altitude CAS missions in joint operations with Army units." Later combat missions proved that the aircraft could sustain heavy damage yet still continue to provide support to ground troops. Its simplicity would endear it to the pilots who later flew it and to the ground troops it supported. In an age when computers drove aircraft, the A-10 was different. It was a pure airmanship aircraft. As Douglas Campbell, author of the definitive book on the A-10's journey to production, put it, "To pilots turned off by new jets' emphasis upon complex combinations of autopilots, radars, and computers, the Hog [A-10] was a return to pure tactical flying."[193]

The Air Force devoted a significant amount of time to training for the CAS mission. After the A-10 reached operational readiness, TAC planners began dedicating a certain number of Red Flag's to the CAS mission. After 1983, the CAS Red Flag became an annual event. During these exercises Marine Corps and Army units were invited to participate. These exercises allowed ground troops to train alongside CAS pilots and demonstrated just how useful the A-10 was in performing the CAS mission. A-10 pilots also participated in the two Air Warrior exercises. Air Warrior I, conducted at Nellis AFB, focused on supporting large ground-unit maneuvers. Air Warrior II, conducted at Barksdale AFB, focused on "low-intensity" conflicts and urban warfare. In 2006, Air Warrior was re-named "Green Flag." A-10 pilots who attended the Fighter Weapons School also trained to perform search and rescue operations as a command element. The A-10 was able to provide on scene command and control during these events. Because the aircraft flew "low and slow" it was the perfect aircraft to provide the critical command element during a rescue operation. More than any other aircraft, the A-10 represented

[193] Douglas N. Campbell, *The Warthog and the Close Air Support Debate* (Annapolis, Md.: Naval Institute Press, 2003), 118, Christopher E Haave and Phil M. Haun, eds. *A-10s Over Kosovo: The Victory of Airpower Over a Fielded Army as Told by the Airmen Who Fought in Operation Allied Force*. Maxwell Air Force Base, AL: Air University Press, 2003, 3

what could be accomplished when an unsophisticated aircraft was put in the hands of a well-trained pilot.[194]

The Dawning of the Advanced Fighters and the "Reformers"

In September 1968, while the war in Vietnam claimed one squadron per month, the Air Force put forth a request proposal for the next generation of air-to-air fighter. By that time, the Air Force was already aware that the F-4 was not the advanced fighter it had been billed as and that the training of fighter pilots was not adequate. Since delivery of a nuclear weapon was a primary concern in its design, the F-4 had failings as a dogfighter. The Air Force recognized the need for aircraft that could reach out and kill from long distances. However, Vietnam proved that there was also a need for an aircraft that could still outperform any others in a close-encounter environment in both high-speed and low-speed engagements. To this end, two programs were developed inside the Pentagon to replace the Century Series fighters. The Fighter Experimental (F-X) Program envisioned a large twin-engine air-superiority fighter, while the Advanced Day Fighter Program sought a much smaller and less expensive single-engine fighter aircraft. The Advanced Day Fighter Program later morphed into the Lightweight Fighter Program after the procurement of the F-15 had already been decided. The two programs led to the development of the Air Force's next-generation fighter force. Almost as soon as the new aircraft rolled off the production line and into operational squadrons, new fighters were deployed to Red Flags for air-to-air and air-to-ground combat training.[195]

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[194] ACC, Red Flag Files, Red Flag Summaries, RF-83-1, 1; Christopher E Haave and Phil M. Haun, eds. A-10s Over Kosovo, 4; USAF News release "Air Warrior transforms into Green Flag, 10 Apr 2006, retrieved Mar 18, 2013: http://www.af.mil/news/story.asp?storyID=123028387

[195] Robin Higham and Carol Williams, *Flying Combat Aircraft of the USAAF-USAF, Vol 2* (Manhattan, Kans.: Sunflower University Press, 1978), 25; Air Force Historical Studies Office, "The F-15 Eagle: Origins and Development, 1964-1972," Nov 1974, 33, Although the request for proposals went out in 1968 the F-X program had been underway since 1966. The leading officers who pushed for a pure air superiority fighter included: General Arthur C. Agan, General Gaberiel P. Disosway, and General John Paul McConnell.

As 1969 ended, the "go-ahead" for production of the F-15 was given to the McDonnell Douglas Corporation. Although often cited as a great leap in air-to-air technology (and there is no doubt that it was an advanced aircraft), the F-15 was also a throwback to an earlier generation of aircraft and represented a return to an airplane built specifically for the role of air superiority. In the design of the F-15, the ability to outperform all other aircraft was far more important than the ability to detect them first. The fact that the advanced radars inside the aircraft far outperformed what Soviet bureaus produced at the time was important, but not as important as the pilot's ability to outperform his enemy. As soon as squadrons of F-15s became available, TAC began training the pilots in the art of dissimilar air combat, something prohibited prior to Vietnam.[196]

The first two operational squadrons of F-15s, activated in 1975, were sent to the 1st Tactical Fighter Wing at Langley Air Force Base VA. There were two immediate benefits to having the first F-15 squadrons at Langley. First, Langley was home to the TAC headquarters and it was beneficial to have the Air Force's newest fighter collocated with the MAJCOM to which it belonged. This was so important that the Air Force actually moved the 1st Tactical Fighter Wing from MacDill AFB in Tampa to Langley AFB. Second, there were squadrons of the Navy's new F-14 fighter stationed nearby in Norfolk. General Dixon, the TAC Commander, later said that this allowed the F-15 and F-14 pilots to train together and practice dissimilar air combat against one another.[197]

The procurement of the F-15 was well underway when the Air Force initiated another study group to revive the Advanced Day Fighter Program. The newly dubbed Lightweight

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[196] "History of the F-15 Eagle," Air Combat Command, Tactical Air Command Files, F-15 File, May 1976, 3.

[197] General Robert J. Dixon, Oral History Interview, Air Force Historical Research Agency, 18 July 1984, K239.0512-1591 C.I, 305.

Fighter Program was intended to serve as a well-matched supplement to the F-15 program. The request for proposals began in 1972 seeking a single-engine, lightweight aircraft capable of quick turns and high maneuverability. The high maneuverability was desired for the aircraft's use as a SAM killer. The Air Force was not seriously considering the production of an additional fighter until international interest in the fighter spurred attention in Congress, and the Air Force saw an opportunity to augment the new F-15s. The Air Force quickly realized that it could have the best of both worlds with a powerful twin-engine fighter as well as a smaller, lower cost fighter; the Air Force found that it could have its cake and eat it, too. In early 1975, Secretary of the Air Force John McLucas announced the selection of the General Dynamics YF-16 over the Northrop YF-17 as the Air Force's lightweight fighter. The Air Force recognized that the F-16 could supplement the F-15 and fill roles that were left out during the development of the F-15. In a sense, the F-16 would be everything that the F-15 was not. The F-15 was a large fighter and the F-16 was significantly smaller. The F-15 had been designed specifically as an air-to-air fighter. The F-16 was a multi-role fighter capable of air-to-air-and air-to-ground operations. The two aircraft became the backbone of the Air Force's fighter force and the two aircraft were used to great effect by complementing each other during Red Flag exercises. As complementary systems, the F-15 and F-16 functioned in tandem and provided Tactical Air Command with two credible multi-role platforms capable of destroying enemy air defenses and enemy fighters in any confrontation with Soviet forces. [198]

The F-16 also found a role as part of the Aggressor squadrons that supported the training at Red Flag and the Fighter Weapons School. Its size and ability to turn made it a superb aircraft

[198] Air Combat Command, Military Design Series Files, F-16 File box, "Advanced Tactical Fighter," 3; Air Combat Command, Military Design Series Files, F-16 File box, "Advanced Tactical Fighter," 3; Deborah L. Gable, "Acquisition of the F-16 Fighting Falcon (1972-1980)," Air Command and Staff College, Maxwell Air Force Base, Ala

to simulate enemy MiGs during training. Starting in 1988, the Air Force replaced the F-5 with the F-16 in the squadrons located at Nellis that provided support as the "enemy" during Red Flags. In 2005, the Air Force activated an aggressor squadron composed of F-15s as well. The updated aggressor squadrons proved to be a tougher enemy than some real world threats. Colonel Dan Hampton stated that the Aggressors were composed of "elite American pilots, so their tactics tend to reflect that level of threat—and not necessarily those posed by poorly trained Russian, Chinese, or Middle Eastern aviators."[199]

The dawning of the advanced fighters and the advancements made to realistic training came under attack in the late 1970s. Much like the arguments in the early 2000s and into the 2010s over the F-22 and F-35, similar claims against the necessity of new fighters plagued the Air Force throughout the 1970s. The charge against the new generation of fighters was led by roughly a dozen defense critics in Washington D.C. They dubbed themselves the "reformers," not to be confused with the Military Reform Caucus. Their desire was for smaller and cheaper aircraft in greater numbers than the F-15. The reformers attempted to use a series of training tests to derail the F-15 program. However, results coming out of Red Flag helped refute their findings.

Much like a newer version of McNamara's "whiz kids," the "reformers" carried clout inside the beltway although they had little to no military experience to speak of. Still, their ability to get noticed in the press and in Congress made them a force to be reckoned with, and they leveled valid arguments against a military industrial complex, noting also that senior military leaders were not as concerned with budget overruns as they were with production. Military leaders, especially in the Air Force, despised the reformists, whose mission was, in the

[199] AFHRA, Organizational Records, Lineage and Honors Files, 64th Aggressor Squadron and 65th Aggressor Squadron ; Dan Hampton, *Viper Pilot*, 139.

military's opinion, to kill procurement of a modernized force . Air Force Chief of Staff Lew Allen Jr. remembered:

> Cacophony of criticism that came from what are sometimes called the Reformists, sometimes called the Simple or Better People, but a whole group of people, a large number of whom were resident in the Pentagon; that is, who were former Air Force officers or consultants to OSD [Office of Secretary of Defense] who made it their business to continuously harass the Air Force with regard to its decisions in the procurement of tactical aircraft in particular. These people insisted on misinterpreting the results of the [Air Intercept Missile Evaluation and Air Combat Evaluation] AIMVAL/ACEVAL tests, making arguments that large numbers of F-5s were better than smaller numbers of F-15s or F-16s, and continuously trying to put spikes in the wheels of the Air Force's attempts at modernization.[200]

The reformers were led by Air Force Colonel John Boyd. Boyd's energy maneuverability theory was widely heralded as a revolution in air-to-air warfare and continues to be studied by fighter pilots in 2013. The energy maneuverability theory detailed an aircraft's performance in different environments and took into account a number of factors including altitude, speed, and position of an aircraft on the attack and in a defensive posture. His reputation in the Air Force was great. However, Boyd's hubris knew no bounds, and he allowed his reputation to flourish well beyond what most could modestly allow. When asked once during an interview if he enjoyed being known as *the* John Boyd, he responded by saying, "…there is a

[200] General Lew Allen Jr., Oral History Interview, Air Force Historical Research Agency, 8-10 Jan 1986, K239.0512-1694 C.I, 138-139.

distinction there. Is that wrong?" However, outside of Boyd, the level of practical warfighting experience of the common reformer dropped off precipitously.[201]

The reformers lived by one basic creed, which was that higher spending on technologically advanced airframes resulted in diminished capacity to fight wars. Their mantra proved to be, as one Air Force colonel noted, a "fiscal aphrodisiac" to many in Congress. The problem was, at least from the Air Force's perspective, that the mantra was not true. As Chief of Staff of the Air Force General John D. Ryan stated, "You could send a kid up over North Vietnam in an F-5, and it's a cheap airplane, but let's say it cost a third as much as an F-4… you would probably lose at least three of them to every F-4 that you lost." The F-15s was specifically designed to avoid the failings of the F-4. One of the reasons the F-15 was larger than other fighters of the time was the need for the nose of the aircraft to house a powerful radar. Soviet tactics dictated that MiG pilots were controlled by ground stations. The inclusion of the advanced radar in the F-15 allowed American pilots to function more autonomously than their Soviet counterparts, something used to great effect during combat training. The F-15s radar was a technological advancement that proved its merit during Red Flag exercises as it allowed the F-15 to detect enemy aircraft early and thus maneuver to an advantageous position prior to beginning an engagement.[202]

The reformers leveled many charges against the military in general and the Air Force specifically. Most of the charges were detailed in a book by reformer member James Fallows titled *National Defense* (1981). Fallows attacked the Air Force for its lack of concern over the cost of modern aircraft and emphatically stated that the pursuit of technology by the Air Force

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[201] Colonel John R. Boyd, Oral History Interview, Air Force Historical Research Agency, 28 Jan 1977, 85; Air University Library Special Collections, Colonel John Boyd , Aerial Attack Study.
[202] General John D. Ryan, Oral History Interview, Air Force Historical Research Agency, 15-17 May 1979, 172; Air Force Historical Studies Office, "The F-15 Eagle: Origins and Development, 1964-1972," Nov 1974, 31

was a folly. This was not the result being shown at Red Flag exercises where F-15s were proving their worth against numerically superior aggressor aircraft. Fallows and the other reformers drew the ire of fighter pilots and Air Force leaders looking to improve combat capability after the end of the Vietnam War. The reformers attempted to use a series of training tests to prove that the F-15 and F-14 were not worth the investment.

In 1977, as the F-15 was coming into operational readiness, two training tests took place using the Nevada test ranges at Nellis Air Force Base, the same test ranges where Red Flag took place. These tests contributed to the enhancement of training for combat and showed that changes in training did significantly aid in weapons employment during combat. The programs were the Air Intercept Missile Evaluation and the Air Combat Evaluation (AIMVAL/ACEVAL) training exercise. The intent of the tests was quite simple. They pitted Air Force F-15s and Navy F-14s against "enemy" F-5s which simulated Soviet tactics. Air Intercept Missile Evaluations tested the effectiveness of missiles in various scenarios, and Air Combat Evaluations tested the effectiveness of the new F-15 and F-14 against the older-model F-5s to determine if the new aircraft were truly superior to the older aircraft. The basic question of the Air Combat Evaluation tests was whether smaller numbers of newer aircraft provided a force structure that was better suited to carrying out the Air Force's mission than a larger number of older aircraft. The test was one of the earliest uses of the air combat maneuvering instrumentation (ACMI), a computer representation of where the aircraft were in time and space during an engagement. An updated version of ACMI continues to be used in 2013 and over three decades has proved to be a powerful tool in training pilots to visualize their engagements during debriefings.[203]

Some, including John Boyd, attempted to use the Air Intercept Missile Evaluation and Air Combat Evaluation tests as proof that new technologically advanced aircraft were not needed

[203] ACC,TAC Files, Air Intercept Missile Evaluation and Air Combat Evaluation Reports.

and that the answer was the procurement of older aircraft. Boyd was, at best, ambivalent about advanced technologies and their capabilities in advanced fighter aircraft. As a Korean era fighter pilot preferred the simplicity of an aircraft without advanced avionics. However, the results of the Air Intercept Missile Evaluation and Air Combat Evaluation tests proved to be controversial, most notably because each air-to-air engagement required visual identification prior to weapons employment as a mandatory rule of engagement. The training engagements took place in daylight in clear weather. These factors combined to limit the utility of the F-15's and F-14's radars which were designed to identify enemy aircraft outside of visual range and allow the aircraft time to maneuver into an advantageous position prior to an engagement. Also, the only radar missile allowed in the test was the AIM-7 and not the improved AIM-9L models being fielded in the late 1970s. Both the F-15 and F-14 enjoyed higher kill ratios than the F-5s in the tests—a 2.5-to-1 margin of victory—but media outlets reported that the new aircraft were "fought to a draw." However, during Red Flag exercises the F-15 enjoyed considerably higher kill ratios than those demonstrated in the AIMVAL/ACEVAL tests. The Red Flag results proved to be more accurate in the long run than the AIMVAL/ACEVAL tests. During Desert Storm and the Balkans campaigns the F-15 enjoyed a 39-0 kill ratio. Had the newer aircraft been allowed to use radar intercepts (the method which was practiced at Red Flag and home station training events) during the tests versus visual identification, the kill ratios would have been even more skewed. General Allen stated a decade later in 1986 that "They [the reformers] basically defined the war as happening on good days and acknowledged that one would just simply not be able to fight so much on the cloudy days or at night and continued strongly to make these arguments. In the long run we won those [arguments]." The results coming out of Red Flag, as detailed in the

previous chapter, also helped TAC and Air Force leaders prove that what the reformers "learned" during the AIMVAL/ACEVAL tests was incorrect.[204]

The Air Intercept Missile Evaluation tests also proved that the military needed a "fire and forget" weapon. During Red Flags, F-15s were being shot down because of the attention needed to stay focused on one target at a time. The medium-range missile of the time, the AIM-7, required the pilot or weapon system operator to keep the aircraft's radar locked on the target until missile impact. During training exercises, if an aircraft was facing multiple aggressors, the time needed to keep the radar locked on one aircraft meant that the other aggressor aircraft could continue to press to a close in fight. Frank Futrell stated in his book *Ideas, Concepts, and Doctrines: Basic Thinking in the USAF, 1961-1984* (1989) that at "Red Flag training…little inferior F-5 aggressor planes not infrequently came in behind F-15s intent on tracking other targets." The training exercises drove the development of a new technology to fix the problem of having to keep the radar focused on a single target. The AIMVAL tests led directly to the development of the AIM-120 Advanced Medium Range Air-to-Air Missile (AMRAAM). The AMRAAM was a "fire and forget" weapon. Once the missile left the rails there was no need for the pilot to keep his radar locked on the target. He was free to move on to the next enemy. It placed more time and space in the pilot's hands to deal with the closing enemy. However, the Air Force might have been a bit overzealous in its understanding of how well the AIM-120 would function during combat. Air Force Colonel Kevin Robbins stated that when the AIM-120s were introduced to Red Flag exercises, "It was a laser beam. It killed everything you shot it at." AIMVAL/ACEVAL might have been primarily used in duel between less advanced aircraft

[204] General Lew Allen, Jr., Oral History Interview, Air Force Historical Research Agency, January 1986, K239.0512-1694 C.I, 142; AFHRA, Aerial Victory Credits, retrieved 20 March 2013: http://afhra.maxwell.af.mil/avc_query.asp

and more modern aircraft, but the takeaway from the fighter community was the need to kill the enemy in any tactical scenario.[205]

Stealth

The losses to surface-to-air missiles during Vietnam, as well as losses suffered by the Israeli Air Force in 1973, showed the need to find an alternative to the brute force of flying through the coverage of integrated air defense systems. Certainly, the Wild Weasel missions proved effective against surface-to-air missiles sites, and the Red Flag training exercises were demonstrating that properly trained pilots could defeat an integrated air defense system with limited losses, but some scientists and Air Force leaders were looking at a way to bypass air defense threats altogether. A radar defeating aircraft would have a profound impact on both training and real world events. There were only two methods available to defeat radar at that time: lethal (destruction of enemy radar sites) and non-lethal (electronic attack of enemy radar sites). Both circumstances alerted the enemy to the attacker's presence. The idea of an aircraft that could avoid radar dated back to World War II when the German Luftwaffe built the Ho 229. An American fighter that could successfully evade radar would provide a powerful weapon to be used in the event of a war, whether against the Soviet Union or an as yet unknown adversary. Before the aircraft could be used, however, it had to be built, tested, and, more importantly, pilots needed to be trained to fly it, all the while keeping its existence a secret.

In the late 1970s, the Defense Advanced Research Projects Agency (DARPA) began to look at the possibility of building an aircraft with a low enough radar cross-section to render it "nearly" invisible to modern radar systems. The agency was on the hunt for the first true low-observable platform. It is important to remember that being low-observable never equated to an

[205] Air Intercept Missile Evaluation and Air Combat Evaluation Reports, Air Combat Command, Tactical Air Command Files, Frank Futrell, *Ideas, Concepts, Doctrine*, 563; Kevin J. Robbins, interview with author, 11 March 2012.

aircraft being invisible on radar. Simply stated, a low-observable aircraft combined aspects of aircraft design—most importantly the shaping and geometry of the aircraft—with specialized coatings called radar-absorbent materials. When those characteristics were used in conjunction, a properly designed aircraft could, in theory, lower the overall radar cross-section, making the aircraft extremely difficult, but not impossible, to detect. A true low-observable platform could render the threat environment at Nellis and, by extension, the same could be said of a real integrated air defense system.[206]

The Defense Advanced Research Projects Agency's initially required the aircraft companies to determine the feasibility of an aircraft design that would place its radar cross-section below a predetermined threshold. Ironically, Lockheed Martin was not asked to participate. DARPA personnel were not aware of Lockheed's on-going work with low-observable technology. The company had to gain approval from the Central Intelligence Agency to brief DARPA about low-observable projects, which included the A-12, the predecessor to the SR-71 that Lockheed already had in production. Lockheed's design was based on a multifaceted design that would "bounce" radar waves away from the aircraft into space, rather than being redirected back at the radar site. The design and first aircraft went by the code name Have Blue. The Have Blue design was a multifaceted aircraft with radar-absorbent material coatings on it

[206] The original invitation went to: Northrop, McDonnell Douglas, General Dynamics, Fairchild, and Grumman; David C. Aronstein and Albert C. Piccirillo, *HAVE BLUE and the F-117A: Evolution of the "Stealth" Fighter* (Reston, Va.: American Institute of Aeronautics and Astronautics, Inc., 1997); Kenneth P. Werrell, *Chasing the Silver Bullet: U.S. Air Force Weapons Development from Vietnam to Desert Storm* (Washington, DC..: Smithsonian Press, 2003) 125; The second quote comes from the movie "The Man Who Shot Liberty Valence" when a reporter learns that it was not Stewart's character who did the shooting on the movie's titular character. He opts instead to continue with the legendary version of events.

that both absorbed radar and directed its energy away from the aircraft but not back at the radar site, thus giving the Have Blue an extremely small radar cross-section.[207]

In 1977 the Have Blue aircraft participated in a classified training exercise on the Nellis ranges. Marine Corps units equipped with Hawk surface-to-air-missiles were placed on the range and instructed to track and shoot down an incoming aircraft. This unit was provided with the specific flight path of an aircraft. By being given the flight path, it was as if -- as Ben Rich, the director of Lockheed's "skunk works" stated years later -- the unit was being told to "aim right here." Have Blue passed overhead undetected. Despite knowing exactly where to focus their radar, the Marine Corps unit was unable to detect even the slightest hint of the stealth aircraft.[208]

Lockheed was given the go-ahead to build five aircraft for test and evaluation with a follow on of full-scale production for 20 aircraft in the first batch. It seemed that the stealth technology worked, but the Air Force now needed to integrate the aircraft into existing exercises to determine exactly how to use it in combat. The Air Force also needed to find pilots and train them how to fly an aircraft that was neither a fighter nor a bomber. Finally, the USAF also needed an airfield where the aircraft could be hidden during the day and tested at night. The Nellis ranges proved to be an ideal spot.[209]

As soon as Lockheed had won the contract, there began a painful process of making it appear to all other participants that the research request from DARPA had ended. Air Force

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[207] David C. Aronstein and Albert C. Piccirillo, *HAVE BLUE and the F-117A: Evolution of the "Stealth" Fighter*; Kenneth P. Werrell, *Chasing the Silver Bullet: U.S. Air Force Weapons Development from Vietnam to Desert Storm*, 125.

[208] Ben R. Rich and Leo Janos. *Skunk Works*,3-5

[209] For a much more detailed version of the F-117 program, including the theories surrounding low-observable aircraft, see: David C. Aronstein and Albert C. Piccirillo, *HAVE BLUE and the F-117A: Evolution of the "Stealth" Fighter* (Reston, Va.: American Institute of Aeronautics and Astronautics, Inc., 1997). Northrop's low-observable design went by the name Tacit Blue, and although the company did not win the final contract for aircraft production, its curvilinear design would lead it to develop and produce the B-2. The Lockheed company didn't technically call its aircraft Have Blue. "Have" was an Air Force Systems Command first word code name. Thus, Have Blue was the Lockheed design, and Tacit Blue was Northrop's design. There are dozens of programs with the Have designation, including the exploitation of MiG aircraft in the 1970s and 1980s.

Systems Command brought the project into the world of Air Force classification and black programs under the protective restriction Special Access Program/Special Access Required. The Have Blue aircraft itself and all those involved in the continuing project were now put under the code name SENIOR TREND; the SENIOR designation was used for aircraft with any features of low-observable technology, including the U-2 and SR-71.[210]

The full-scale development of the Have Blue program led to the production of the world's first true low-observable platform, the F-117. Aerodynamically, it was a poor aircraft. The initial concept had been called the "hopeless diamond" because many did not believe it was capable of actual flight. Thanks to fly-by-wire technology, also incorporated in the F-16, the jet became not only capable of flight but also of very easy handling, according to the pilots. The shaping of the F-117, along with its radar-absorbent coatings, made it virtually invisible to the radar technology of the time. Its primary objective in war was to "confuse, disrupt, and destroy the enemy's war making capability….The principal targets will be command, control, and communications centers…and other targets of high military value." If the F-117 could deliver in combat what it proved in testing, the U.S. had a weapon that was capable of bypassing enemy air defense systems. However, it would be another decade before its true combat capability was tested.[211]

Training to fly the F-117 had to occur at night and operations conducted during the day had to be timed to avoid passes of the Soviet Union's satellites. After they were built, the F-117s were flown under cover of darkness to a small air base near Tonopah, Nevada -- the same airfield where the 4477th Test and Evaluation Squadron was flying MiG aircraft. Tonopah was remote

[210] William R. Arkin, *Code Names: Deciphering U.S. Military Plans, Programs, and Operations in the 9/11 World* (Hanover, N.H.: Steerforth Press, 2005), 494-496.
[211] Quoted in: Kenneth P. Werrell, *Chasing the Silver Bullet: U.S. Air Force Weapons Development from Vietnam to Desert Storm* (Washington, D.C.: Smithsonian Press, 2003), 132.

enough to allow for unhindered night operations. During the day the Red Eagles flew the MiGs and the F-117s emerged under cover of darkness. Each set of pilots knew what the other group was doing and Tonopah Test Range became home to two of America's most secret programs. The first F-117 pilots were stationed at Nellis Air Force Base, and they were flown each Monday to Tonopah and flown back to Nellis, and their families, on Fridays. The squadron also flew A-7 attack aircraft as part of a weapons testing program. The A-7 was merely a cover story to keep the focus on the personnel flying to Tonopah each week low key. The F-117 was flown only at night. Every maintenance crew member, refueler crew, and other air crews who aided in the training of the stealth pilots had to be given access to the program, also known as being "read in," a not uncommon occurrence even in other operational fighter squadrons. Nevertheless, it was essential to security to ensure that everyone who had access to the black jet performed a necessary "material contribution" to the overall program.[212]

The F-117 added a powerful weapon system to Tactical Air Command's arsenal, but training to employ the aircraft was very different from training in other Air Force aircraft. It was a fighter aircraft in name only. It carried only two bombs and relied entirely on its stealth attributes for protection. Pilots chosen to fly the F-117 had to essentially unlearn what they had learned about flying fighter aircraft in their previous training. Fighter aircraft often work in groups of two, four, or more depending on the mission. F-117 pilots were trained to perform their missions alone and on radio silence. F-117 pilot Lieutenant Colonel William B. O'Connor stated that the training he experienced in learning to fly the F-117 was very different from the training to fly other fighters. "The F-117 world was a different sort of community than I was used to," O'Connor said. "We rarely, if ever, expected to employ as a formation, so individual

[212] Ben Rich and Leo Janos, *Skunk Works*, 92-94

action was pretty much all that counted. But that's why only experienced pilots, with at least one fighter or bomber tour under their belts, were accepted for training."[213]

Colonel Al Whitley, the first wing commander for the F-117s, said:

> We were forced to live like vampires in a cave….The F-117 is a night attack plane using no radio, no radar, and no lights. The Skunk Works stripped the fighter of every electronic device that could be picked up by ground-to-air defenses. The engines were muffled to eliminate noise. We flew below thirty thousand feet to avoid contrails on moonlit nights. We carried no guns, no air-to-air missiles because the airplane wasn't designed for high-performance maneuvering, but [rather] to slip inside hostile territory, drop its two bombs and…get out.[214]

F-117 pilots learned in their training courses that there would be no high-G maneuvers, the aircraft relied entirely on its low observable coatings to avoid detection. The aircraft's location at Tonopah Airfield, which was located within the Nellis Ranges, meant it would not have to deploy to a Red Flag since it was already conducting operations in the same airspace.

The F-117 "openly" began participating in Red Flag exercises after the aircraft was revealed and acknowledged by the DOD in November 1988. In all likelihood the stealth fighter had participated in Red Flag long before that. The implications of the F-117 for changes in training and combat were immense. Whereas a typical strike package not only included the strike aircraft but other supporting aircraft including protective air support, the F-117 would have no need for support aircraft. Although without defensive armaments its ability to traverse enemy airspace undetected was protection enough. The F-117 was inserted into specific training

[213] William B. O'Connor, *Stealth Fighter: A Year in the life of an F-117*, Pilot St. Paul, MN: Zenith Press, 2012, 61
[214] Al Whitley, quoted in Ben R. Rich and Leo Janos, *Skunk Works*, 94.

exercises in the late 1980s, but all participants, including the aircraft refueling the F-117 on the training missions, had to be "read in" to the program to maintain the program's secrecy.[215]

The State of Affairs in 1980

The Air Force had already fielded a new air-superiority fighter in the F-15 with another multirole platform on order, the F-16. Close air support had not been taken from the Air Force's mission set, and the Air Force had developed an attack aircraft with this as its sole mission. Although no one in the public and most in the government did not know about it, the F-117 program was prepared to render Soviet air defense systems all but useless. Along with these new Tactical Air Command aircraft, a new aerial refueler had been ordered (the KC-10), and the Military Airlift Command had large numbers of airlift assets. Only Strategic Air Command could say with any credibility that it had had a program cancelled, but even that program was soon to be revived.

The most important developments in aircraft procurement after Vietnam were the various new aircraft including the A-10, F-15, F-16, and F-117 to the Air Force's arsenal. These new systems, coupled with upgrades and advancements to the F-111 and F-4, presented the Tactical Air Command with a highly modernized and technologically advanced fleet. However, the most important contribution to the Air Force's preparation for combat was that each new aircraft was tested in various realistic training exercises. Having new systems and technologies could not by itself lead to success on the battlefield. More than anything, the Air Force needed a way to train the pilots of these aircraft in a realistic manner to ensure that, when they faced combat, they

[215] 57th Wing History Office, Red Flag Files, Red Flag Story boards. The story boards which detail the history of Red Flag hang inside the Red Flag facility; Lieutenant Colonel (ret.) Dallas K. Stephens, interview with author, 16 August 2012; Jim Cunningham, "Cracks in the Black Dike: Secrecy, Media and the F-117," *Airpower Journal*, Vol V, no. 3, Fall 1991, http://www.airpower.maxwell.af.mil/airchronicles/apj/apj91/fal91/cunn.htm ; Jeffrey P. Rhodes, "The Black Jet," *Air Force Magazine*, Vol. 73, No. 7, July 1990, http://www.airforce-magazine.com/MagazineArchive/Pages/1990/July%201990/0790blackjet.aspx

would be prepared for the enemy and capable of rendering him ineffective quickly and efficiently. This training was found in the Red Flag exercises.

As each new airframe entered into the Air Force's inventory as operationally ready, the airframe was quickly integrated into Red Flag exercises. The F-15, the F-16, and even the still-secret F-117 all flew their first "combat" missions over the Nellis Air Force Base training ranges rather than enemy territory. When the airborne warning and control system came on line, it too trained at Nellis Air Force Base. After the Red Flag exercise, each squadron returned home and continued to refine what it had learned. The technology was astounding. Still, American and Soviet jets continued to advance technologically at roughly the same pace. For every advanced fighter developed in America, the Soviets answered with one of their own and in much greater numbers. The difference between the American style of air war and the Soviet style was that the Soviets took orders from their controllers on the ground, while the Americans took directions from their airborne controllers, and the tactical execution was left to the pilots. Every country that has a military trains for war. However, only in the U.S. was combat simulated in so realistic a manner. The realistic training that Red Flag afforded was valuable and something not duplicated in other countries. The F-15 was a capable fighter in many pilots' hands, but it became supremely lethal after its pilots participated in Red Flag or were selected to go the Fighter Weapons School. Although it could be said that the first real combat faced by American pilots in the F-15 and other tactical fighters was during Desert Storm, the pilots had actually been training for years in the realistic combat environment on the ranges of Nellis Air Force Base. American and Soviet fighter aircraft developed along parallel lines, but it was in the field of training its combat pilots that the American way of aerial warfare significantly differed from the

Soviets. The Soviet Union's fighter pilots may have served under one, but they had no training equivalent for the American Red Flag.

CHAPTER 5 - Short of War: Air Power in the 1980s

Although much has been written about air operations in Vietnam and Desert Storm, relatively little attention has been paid to air operations during the 1980s. What effect did changes in training in the 1970s have on the conduct of the "small wars" of the 1980s? Colonel Robert Venkus, the commander of the F/B-111 squadron that led the attack against Libya in 1986, stated that this venture, known as Operation El Dorado Canyon, would be viewed only as a "footnote in American history." Yet he also called it a "benchmark by which other military capabilities can be measured." It certainly was a benchmark not a footnote. The importance of Operation El Dorado Canyon has not been overlooked by scholars. [216]

Operations in the 1980s clearly show the effects the training revolution was having on real world events. Furthermore, air operations of the 1980s, and El Dorado Canyon in particular, demonstrated that the movement away from a strategic force towards a tactical one was readily apparent by the mid-1980s. The Air Force's identity increasingly depended on the capabilities of the smaller fighters rather than on those of the big bombers. Of greater importance, the bomber force was already being operationally replaced by smaller, faster fighter-bomber aircraft. These fighter-bomber aircraft could not deliver ordnance in the same tonnage, but they could deliver it accurately with a higher chance of survival than the B-52s. Large-force exercises, especially Red Flag, also had a direct impact on the ability of the Air Force to conduct the raid against Libya and other lesser known air operations of the 1980s. Finally, conversations between the Tactical Air Command and the U.S. Army's Training and Doctrine Command also influenced operations in the 1980s and 1990s.

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[216] Robert E. Venkus, *Raid on Kaddafi: The Untold Story of History's Longest Fighter Mission by the Pilot Who Directed It* (New York: St. Martin's Press, 1992), xiv.

The Thirty-One Initiatives

There was another important change to the Air Force's structure, and one that affected ongoing training programs, which occurred in the 1980s that allowed for combat success in later conflicts. A closer relationship developed between the Air Force and the Army primarily because of actions taken at the Tactical Air Command. This relationship helped change the way the Army and Air Force trained *together* for combat. On 30 June 1982, General Lew Allen, Jr. ended his tenure as Air Force chief of staff and was replaced on 1 July 1982 by Charles A. Gabriel. Although often overlooked as a simple change of command, it was, in fact, a paradigmatic shift that had far-reaching implications. Since Carl A. Spaatz had become the first Air Force chief of staff, each and every one of his successors either had been bomber pilots or held significant bomber commands in the Strategic Air Command. This trend lasted forty-five years and demonstrated that the focus of the Air Force was on bombardment as the dominant way of war. General Gabriel was different. He was the first fighter pilot to become chief of staff. Subsequently, all of Gabriel's successors were former fighter pilots until the firing of T. Michael Moseley in 2008. The change between General Lew Allen and General Charles Gabriel was anything but routine.[217]

General Gabriel is often overlooked in air power histories. Many texts focus on the changes made by General Wilbur Creech as Tactical Air Command commander, but the changes signed into existence by Gabriel, and the relationship that developed with the U.S. Army, are as important as the changes made to TAC under Creech. In 1946, General Eisenhower, as part of the post-war reorganization, co-located the Army's Army Ground Forces Headquarters, the U.S. Army Air Force's Tactical Air Command, and the Navy's Atlantic Fleet Command in the

[217] George M. Watson Jr., *Secretaries and Chiefs of Staff of the United States Air Force* (Washington, D.C.: Air Force History and Museums Program, 2001), 161-168.

Hampton Roads area of Virginia. It was a practical move that benefited all services but especially the Army and the soon-to-be-minted U.S. Air Force. Twenty-three years later, when the Army was looking for a home for the newly established Training and Doctrine Command, it was no accident that Army leaders chose Fort Monroe, and later Fort Eustis, both a mere ten-minute drive from Langley Air Force Base. Training and Doctrine Command was the direct descendent of the Army Ground Forces command, and the location so close to Langley Air Force Base allowed for a dialogue between services not commonly seen before.[218]

The location of the Tactical Air Command and Training and Doctrine Command facilitated a series of discussions to take place that led to a set of important initiatives that had implications to the Air Force's training programs. Army Chief of Staff General Creighton Abrams initially proposed the idea of closer cooperation with the Air Force in a letter to Training and Doctrine Command's first commander, General William E. DePuy. Abrams stated that, "since there exists in the Army and Air Force a unique complementary relationship to conduct warfare…it is absolutely essential that a close relationship exist, at all levels, between the two services." DePuy put forth an invitation to Tactical Air Command's commander, General Momyer, to meet to discuss matters of "mutual interest." Although Momyer never accepted the offer, his immediate successor, General Robert Dixon, did and began an ongoing dialogue between the two commands in 1973. After the initial meeting between Dixon and DePuy, the two generals agreed to organize subcommittees to discuss changes to existing doctrine. The committees proliferated, and in 1975 the two commands established an overall bi-service organization, the Air-Land Forces Application Agency, to provide guidance to the committees.

[218] For works that deal with General Creech's contributions while TAC Commander see: James C. Sife, *Creech Blue: General Bill Creech and the Reformation of the Tactical Air Forces*; James Kitfield, *Prodigal Soldiers*

The Air-Land Forces Application Agency and its multiple subcommittees accomplished an integration rarely seen between services.[219]

One of the first mission sets addressed under the Air-Land Forces Application Agency was suppression of enemy air defenses. In short, the Army depended on the Air Force for close air support, and, to provide close air support effectively, the Air Force needed to control the air. To control the air, the Air Force needed to destroy the air defense systems, something never achieved during the war in Vietnam. It became a mutual problem for the Army and Air Force and one that could be trained against at Red Flag and other joint training exercises. The members of the Training and Doctrine Command recognized that the Air Force needed support in its effort to achieve the suppression of enemy air defenses for them to effectively provide close air support to ground units. The solving of such problems created a symbiotic relationship. The result of the discussions about close air support was the joint pamphlet "Concept for the Joint Suppression of Enemy Air Defenses," published in 1981 and circulated throughout the Army and Air Force. The doctrine on joint suppression of enemy air defenses stipulated that the Army's ground forces were to focus on ground-to-air fire within line of sight and that the Air Force focus on surface-to-air fire against Army assets beyond line of sight. An air component commander held responsibility for planning and executing the campaign to suppress of enemy air defenses, something that came to fruition in 1991. Not long after the publication of the pamphlet, suppression of enemy air defenses became a major focus at the Red Flag exercises.[220]

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[219] Richard G. Davis, "The 31 Initiatives: A Study in Air Force-Army Cooperation," Office of Air Force History, Washington, DC..: 1987), 27; letter from Abrams to DuPuy, Air Combat Command, Tactical Air Command Archives, Tactical Air Command-TRADOC Files, 5 October 1973; Wayne A. Myers, "The TAC-TRADOC Dialogue," Air Combat Command, Tactical Air Command Archives, Tactical Air Command-TRADOC Files; Robert J. Dixon, "Draft: The TAC-TRADOC Dialogue," Air Combat Command, Tactical Air Command Archives, Tactical Air Command-TRADOC Files.

[220] Wayne A. Myers, "The TAC-TRADOC Dialogue," Air Combat Command, Tactical Air Command Archives, Tactical Air Command-TRADOC Files; Robert J. Dixon, "Draft: The TAC-TRADOC Dialogue," Air Combat Command, Tactical Air Command Archives, Tactical Air Command-TRADOC Files.

The conversations between Tactical Air Command and Training and Doctrine Command influenced every aspect of Army-Air Force coordination over the next several years. It was nothing less than the two services working out the very nature of what it meant to be "joint" on the battlefield. Strategic Air Command's headquarters in Omaha, Nebraska, and its focus on a singular mission set precluded its participation in the ongoing conversation. Therefore, Strategic Air Command had no say in the future of joint operations. This suited Strategic Air Command's leaders just fine. Still, it represented another nail in the coffin of a command which was quickly losing touch with reality.

The crowning achievement of the meetings between TAC and TRADOC was the creation and implementation of the "thirty-one initiatives" by Chief of Staff of the Air Force General Gabriel and Chief of Staff of the Army General E.C. Meyer. The thirty-one initiatives addressed the very nature of the battlefield; they did not necessarily define the size or scope of the battlefield itself, but rather each service's lines of responsibility both on the ground and in the air. The initiatives detailed the important areas and concepts of air defense, rear-area operations, and the forward edge of the battle area, among other things. The initiatives allowed the pilot's flying in Red Flag exercises to sharpen their focus on ground support operations and also helped Army ground commanders better understand the steps the Air Force was taking to provide better support to the ground forces.[221]

As Air Force historian Richard G. Davis stated, "For ten years the [Tactical Air Command−Training and Doctrine Command] dialogue not only stimulated Air Force-Army cross-fertilization of ideas, it provided a high-level forum for open and frank discussion." More

[221] Richard G. Davis, "The 31 Initiatives: A Study in Air Force—Army Cooperation," Office of Air Force History, Washington, D.C.: 1987, 46; Wayne A. Myers, "The TAC-TRADOC Dialogue," Air Combat Command, Tactical Air Command Archives, Tactical Air Command-TRADOC Files; Robert J. Dixon, "Draft: The TAC-TRADOC Dialogue," Air Combat Command, Tactical Air Command Archives, Tactical Air Command-TRADOC Files.

important than the above-mentioned agreements and memoranda was the fact that Tactical Air Command took the lead in the ongoing discussion between the Air Force and the Army as to what services the Air Force could and would provide on the battlefield. By the late-1970s, Tactical Air Command spoke for the Air Force primarily because of the relationship cultivated between TAC and TRADOC. The Air Force Chiefs of Staff, prior to Gabriel, were still former bomber pilots but SACs headquarters in Nebraska precluded its ability to influence this growing, and tactically minded, relationship between TAC and TRADOC that extended into the late 1980s. Still, there remained a lot to be accomplished on the training fields if the Army and the Air Force were going to be able to work effectively together. Operations beginning in 1979 demonstrated just how much remained to be done in the joint training arena so that the services could operate together in a meaningful manner.[222]

Operation Eagle Claw, the attempted rescue of Americans being held hostage in Tehran by the new Islamic regime of Ayatollah Khomeini, was conducted in 1980. The operation involved no tactical Air Force fighters, although it was composed of a joint strike force of special operations troops and aircraft. The operation was another failure in a long string of defeats for the military and was viewed by the junior officers who were attempting to create change in the services as a continuation of the problems that had plagued the military through Vietnam. In Iran, meanwhile, many hardliners saw the mission's failure as divine intervention. In fact, although it failed in its direct purpose, Eagle Claw helped to motivate many service persons who wanted reform, since the operation threw into sharp contrast just how much still needed to be accomplished at training exercises between the services despite the myriad advances already taking place in the Air Force.

[222] Richard G. Davis, "The 31 Initiatives: A Study in Air Force—Army Cooperation," Office of Air Force History, Washington, D.C.: 1987, 32.

In all, eight service members lost their lives, and another four were wounded during the Eagle Claw operation. The biggest insult to the military came when Iranians visited the site and broadcast pictures of the destroyed C-130 variant as well as five helicopters left abandoned in the desert. However, a silver lining appeared in the ashes of the disaster. Eagle Claw directly led to changes that would impact later combat operations: the Goldwater-Nichols Act of 1986.

The first "major" conflict of the 1980s was the American invasion of the Caribbean Island of Grenada in October 1983. The operation was code-named Urgent Fury and was launched in response to a military coup that had unseated the government, a government that itself had seized power in 1979. Of particular importance to the Reagan administration were the some 800 medical students at the Saint George's University Medical School on the island. Militarily, the invasion was unimpressive, especially from the perspective of air power, because there was no air threat or even surface-to-air threat. During Urgent Fury the U.S. military held air supremacy, but only because there was no threat to begin with. The Air Force had a limited role in the operation by providing close air support and air superiority fighters, but the outcome nevertheless had implications for how future operations involving large amounts of air presence were to be conducted. In short, Urgent Fury demonstrated there needed to be a better way for ground troops and air assets to communicate with each other. As the official Joint Staff review stated, "Lack of interoperable communications exacerbated systemic lack of command and control." This was something that was passed back to Red Flag and practiced during other large interservice exercises in the late 1980s.[223]

[223] Ronald H. Cole, "Operation Urgent Fury: Grenada," Joint History Office, Office of the Chairman of the Joint Chiefs of Staff, Washington, DC, 1997, 67

El Dorado Canyon

Operation El Dorado Canyon was the first real world event to clearly demonstrate that the Red Flag training environment could provide real world success. Libyan leader Muammar Kaddafi viewed Operation Eagle Claw and the lack of response to the Beirut bombing as evidence the U.S. was little more than a paper tiger. Kaddafi's support of terrorism included the hijacking of Trans World Airlines Flight 847 at the airport in Beirut in 1985 and shootings at the Rome and Vienna airports. These events placed the Kaddafi regime in American President Ronald Reagan's crosshairs. However, there was only one means of military power that could be used against the dictator: air power. Whether it came in the form of Navy assets or Air Force assets was largely irrelevant. Both sides offered unique abilities. The Navy's carrier battle groups were much closer to potential targets than Air Force assets were, and so they were in a better position to face Kaddafi's Air Force, something the Navy proved in the 1980s by downing four Libyan aircraft in two separate engagements. The Navy could also strike at Kaddafi's coastal air defenses and his naval assets. However, if a larger operation, one that went into downtown Tripoli, was to be undertaken, it would require the use of Air Force fighter-bomber assets stationed in Europe; the U.S Navy had attack aircraft but not ones capable of low level penetration like the Air Force's FB-111s. Furthermore, the FB-111 pilots continuously trained to just such a mission. This operation would demonstrate whether or not the training conducted at Red Flag and daily home station training was indeed "realistic" in nature.[224]

[224] Extract from Michael J.F. Bowyer, *Force for Freedom: The USAF in the UK Since 1948* (Somerset, U.K.: Haynes Publishing, 1994), Air Combat Command, Tactical Air Command Archives, Contingencies Files, Operation El Dorado Canyon.

The Line of Death

On 15 April 1986, the U.S. launched an air strike against Kaddafi and his military. The raid was conducted in direct response to Kaddafi's support of terrorism and to the dictator's other erratic behavior. El Dorado Canyon is important for several reasons. First, and most importantly, it demonstrated that Red Flag and other training exercises worked. Every member of the raid team had either attended a Red Flag or similar exercises in Europe and each member was reared in the post-Vietnam culture that placed such importance on realistic training as a precursor to actual combat. Second, the raid demonstrated that tactical-level assets could have a strategic-level impact when properly planned and executed. Third, the raid demonstrated that bomber aircraft were not the only ones capable of long-endurance flights to reach targets. Fourth, it proved that a very complex mission involving multiple services and aircraft traveling great distances could coordinate and execute an attack down to minutes. Finally, the raid, accomplished with FB-111 fighter bombers and A-7s from Navy aircraft carriers allowed them to supplant the bomber as the dominant form of air power in the American consciousness. Air Force heavy bombers had neither the survivability nor the ability to strike with precision against targets in urban settings.

By 1986, the military had already skirmished with Kaddafi's forces on more than one occasion. Author Joseph T. Stanik called these engagements "Reagan's undeclared war" with Libya. In one incident in August 1981, two Navy F-14s turned to intercept a pair of Libyan Sukhoi Su-22s. One of the enemy aircraft fired an AA-2 Atoll missile. The F-14s evaded the missile and turned to engage the Su-22s, which had flown past them and turned hard to the starboard in an attempt to get away from the American jets. The F-14s turned in behind the aircraft and fired a pair of AIM-9 Sidewinders, which downed both of the enemy fighters. This

brief engagement became known as the Gulf of Sidra incident. It would not be the last time Navy fighters tangled with Kaddafi's air force.[225]

Kaddafi challenged American resolve by drawing a wholly fanciful and unenforceable "line of death" across the Gulf of Sidra in defiance of international maritime law and freedom of navigation acts. He claimed the waters as Libyan national territory, a claim not entirely untrue, since the Libyans claimed this was a territorial sea not an open sea. Libya was also not the first country to dispute the line between domestic and international waters. Kaddafi believed that the U.S. was incapable of launching a substantial attack against Libya. The Navy ignored the line, flying its aircraft openly across it as part of usual operations. In March 1986, with the addition of a second carrier battle group, the Navy crossed the line of death by sea, asserting the right of freedom of navigation.[226]

In early 1986, Reagan initiated a series of military exercises specifically to cross the line of death and force Gaddafi to recognize the international nature of the waters or face a conflict with the Navy. Navy aircraft engaged in several "tussles" with Libyan aircraft involving dogfights but with no weapons employed. In every instance, the American air crews successfully gained a firing position on the Libyan aircraft without the Libyan MiGs getting into their own weapons employment zones. The Libyans also routinely launched several surface-to-air missiles, with the Navy pilots responding by destroying the surface-to-air missiles' radar sites. Navy air assets also fired on several Libyan corvettes and patrol boats as they attempted to intercept the American fleet. The Navy sank two Libyan ships and heavily damaged two more. Libya and the U.S. seemed to be locked into a tit-for-tat engagement against each other, but it

[225] Joseph T. Stanik, *El Dorado Canyon: Reagan's Undeclared War with Qaddafi* (Annapolis: Md.: Naval Institute Press, 2003), 51-63.
[226] Joseph T. Stanik, *El Dorado Canyon*, 27-29; Operation El Dorado Canyon After Action Report, July 1986, Air Combat Command, Tactical Air Command Files, Contingences Files.

was the Libyan dictator's not entirely covert support of terrorism that finally galvanized the Reagan administration into a more stringent response.[227]

The final straw came on 5 April 1986 when a bomb exploded in a nightclub in West Berlin, killing three people, including two American service members, and injuring hundreds more. American intelligence had evidence that the bombing had been carried out by Libyan agents. The tit-for-tat engagements in the Gulf of Sidra were not sending a strong enough message to the Libyan dictator that the U.S. would not tolerate terrorism, or at least the message was not being received. Reagan decided to make sure he was heard and ordered the Air Force to execute a mission that demonstrated American resolve. Thus, the final preparations for Operation El Dorado Canyon were set in motion.

The Air Force had planned specifically for an attack against Libya for more than a year and, as a result, El Dorado Canyon planners did not begin their mission preparation from scratch. The specific planning was in addition to normal training sorties and exercise participation that the FB-111 pilots conducted as part of usual operations. Historian Joseph T. Stanik said in his work *El Dorado Canyon* (2003) that the Red Flag exercise helped the fighter-bomber pilots develop the "innovative delivery tactics," that made the raid a success. The plan called for eighteen FB-111 Aardvark fighter bombers of the Forty-Eighth Tactical Fighter Wing to fly from their home station at Lakenheath Air Force Base in England to Libya. The aircraft were to penetrate Libyan air space at extremely low altitudes and attack three different target sets in Tripoli and Benghazi, including Tripoli's airport, Libyan air bases, terrorist training camps, and command and control facilities. Kaddafi, himself, was not directly targeted as part of the attack. As the main attack platforms, the FB-111s were supported by Navy assets operating in the Gulf

[227] Joseph T. Stanik, *El Dorado Canyon*, 84-85; Operation El Dorado Canyon After Action Report, July 1986, Air Combat Command, Tactical Air Command Files, Contingences Files.

of Sidra. The use of Navy A-6s and Air Force FB-111s was intentional. They were the only assets available to conduct precision delivery at night in the high-risk environment over the two major Libyan cities. [228]

The night before the crews departed for the attacks, they were surprised to receive a visit from Air Force Chief of Staff General Charles Gabriel. Although Gabriel's visit had been scheduled months in advance and the timing of it was by and large fortuitous, many of the crews took the visit by the chief of staff as confirmation that the attack was on. The next evening, 15 April 1986, the FB-111 crew members briefed about the mission and stepped to their waiting aircraft.[229]

France and Spain refused to grant overflight rights to attack Libya, even though France itself had been on the receiving end of Kaddafi's terror. As a result, the American military orchestrated the raid on its own. In order to pull off the immense raid, the Air Force assembled a massive aerial armada consisting of twenty-eight KC-135 and KC-10 refuelers in the skies over the English coastline. KC-135 tankers refueled KC-10s that, in turn, refueled the FB-111s. It took the twenty-four FB-111s four in-flight refuelings to be able to reach the target and two more refuelings each on the return leg after the strike. This well-choreographed movement of aircraft had to be accomplished "comm-out," which meant no radio communication between the tankers and the fighters. Some of the pilots had never refueled from the KC-10s at night, but they had become proficient at it by the time they returned home.[230]

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[228] Robert E. Venkus, *Raid on Kaddafi* (New York, NY: St. Martin's Press, 1992); Joseph T. Stanik, *El Dorado Canyon*, 200

[229] Operation El Dorado Canyon After Action Report, July 1986, Air Combat Command, Tactical Air Command Files, Contingences Files.

[230] Robert E. Venkus, *Raid on Kaddafi*. Of the twenty-four FB-111s that took the initial aerial refueling, six were "air spares" that were not needed for the raid and returned to base. They would have continued on only if one of the primary attack aircraft had some type of malfunction which required its removal from the attack.

As the aircraft approached the Libyan coast the real question was whether proper training had prepared the pilots for the combat they were about to face. Had simulated threats at Red Flag replicated the very real surface-to-air missiles and anti-aircraft fire they pilots were about to be exposed to? The Red Flag exercise was being put to the ultimate test as the attacking Air Force aircraft drew nearer to their targets and the Navy launched from the Gulf of Sidra. This raid was the entire reason Red Flag had been created in the first place. Although this was the first combat mission for many of the pilots, they had each trained at Red Flags and other exercises to prepare for this moment.

The mission was, in reality, two separate strikes. The 1986 raid is often recorded as an Air Force success, which ignores the participation of naval assets. In the waters off the Libyan coast, the *USS America* and *Coral Sea* aircraft carriers launched F-14 Tomcats for fleet defense as well as a strike package composed of twelve A-7 Corsairs and fourteen A-6B Intruders as well as F-18 Hornets to protect the strikers. Red Flag was not the only program tested that night. The Constant Peg MiG training program also demonstrated its utility. One of the F-18 pilots that night was Commander John Nathman, a former Red Eagle and MigG-23 pilot. Nathman was able to use his experience in flying MiG aircraft to impart to his more junior pilots what the aircraft looked like and how it would behave in combat. Most importantly he impressed upon the younger pilots the methods and tactics necessary to defeat the MiGs if they rose to meet the Americans that night. This was something the Libyan pilots could never have dreamed of facing. There was no program for Libyan pilots to train against American assets. The Libyans also had no idea that there were American pilots who were more capable in the MiG aircraft than they themselves were. Changes in training after the American war in Vietnam were about to be put to

a real test. The results proved that the Red Flag exercise worked and that its simulations more than adequately prepared the pilots for combat. [231]

The Attack

Similar to the training exercises conducted over the Nevada Desert, the FB-111s split into separate groups to hit Kaddafi's headquarters, the Bab al-Azizia Barracks, the Murat Sidi Bilal terrorist camp, and the Tripoli airport where Libya's Soviet-made transport aircraft sat parked on the ramp. Navy assets also headed for Benina Military Air Base to destroy as many of Kaddafi's parked fighters as possible to prevent pursuit of the exiting strike force. Support from the Navy was under way as the jets sped at extremely low altitudes and headed into the heart of Tripoli. [232]

The actual attack lasted only a few minutes, beginning at exactly 0200 on the morning of April 15. At the Bab al-Azizia Barracks, nine FB-111s thundered in a trail formation separated by several thousand feet each. The first aircraft released its weapons for a direct hit. However, the rising smoke from the bombs interfered with several of the laser designators carried by the following aircraft. Of the nine aircraft, only four released their weapons, four aborted, and one was lost to either pilot error or a Libyan air defense weapon. It was the only loss of the raid. At the Murat Sidi Bilal Camp, all three aircraft successfully employed their weapons. At the Tripoli Airport, five of the six aircraft employed weapons. The same was true at the Jamahiriya Barracks and the Benina Airfield, which were struck by Navy assets. [233]

The El Dorado Canyon operation proved that the realistic training revolution worked. Pilots tested during Red Flag exercises were able to get the needed "ten combat missions," under

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[231] Joseph T. Stanik, *El Dorado Canyon*, 176-184, Steve Davies, *Red Eagles*, 285-286

[232] Robert E. Venkus, *Raid on Kaddafi*, 67-70; On the eastern side of the Gulf of Sidra, a separate Navy attack group hit targets in Benghazi; Joseph T. Stanik, *El Dorado Canyon*, 183-185.

[233] Joseph T. Stanik, El Dorado Canyon: Reagan's Undeclared War with Kaddafi, 185-187; Robert E. Venkus, *Raid on Kaddafi*, 69-102; Operation El Dorado Canyon After Action Report, July 1986, Air Combat Command, Tactical Air Command Files, Contingences Files. Despite the passage of more than twenty-five years, the after action reports remain classified documents.

their belts in a training environment and this prepared them for actual combat. Historian Joseph T. Stanik stated that the success of the raid against Kaddafi could be traced directly to the implementation of Red Flag in 1975. In Stanik's opinion, "The air warfare skills honed at Red Flag were heroically demonstrated in the night sky over Tripoli." Participants in the raid traveled thousands of miles and dropped a small amount of ordnance against a few select targets. Still, what the raid on Libya proved had far-reaching effects on some American military thinkers. If a relatively small number of aircraft piloted by properly trained individuals could precisely deliver their munitions, which were not necessarily precision-guided munitions, why couldn't the same be demonstrated on a much grander scale? As mid-grade officer at the time, John Warden saw the raid as proof that air power, specifically tactical air power, could accomplish strategic-level missions in the absence of ground power. Warden, an air power purist, took lessons from the Libyan raid and applied them in his thesis at the National Defense University. The paper would eventfully be published as *The Air Campaign*, a guide to what air power was capable of providing to a commander on the joint battlefield. El Dorado Canyon heavily influenced Warden's thinking about the future of air power. Warden and a select band of acolytes took the lessons learned from the Libyan operation and applied them writ large to air campaign planning. The tactical aircraft of the Forty-Eighth Tactical Fighter Wing demonstrated clearly that a new way of air warfare was rapidly maturing. However, not everyone in the Air Force was prepared for such a radical departure from the dominant paradigm and traditional way of doing business.[234]

[234] Joseph T. Stanik, *El Dorado Canyon*, 200.

Panama

The success of the Red Flag exercise was not always clearly demonstrated in actual combat. The operation in Panama to overthrow Manuel Noriega, code named Just Cause, included the first use of F-117s in a combat role. The use of the F-117 served no distinct or recognizable purpose in 1989. Even before the attack, Secretary of Defense Dick Cheney questioned the use of the F-117s in Panama, stating, "C'mon, guys. How severe is the Panama air defense threat?" Cheney was worried, and rightly so, that the press would view the use of the F-117 as mostly an attempt to justify building this weapon system. Nevertheless, General Carl Stiner, commander of the Eighteenth Airborne Corps and Joint Task Force South, specifically asked for the F-117 and insisted that the aircraft be used to stun and not kill the troops at the Rio Hato barracks. Stiner believed that killing the troops would stiffen resistance elsewhere in the country but that a well-placed bomb 150 yards away from the barracks would induce surrender by Army units on the ground. Because of the exacting need for such a specific point of impact, Commander of the Twelfth Air Force Lieutenant General Peter Kemph recommended use of the F-117s. In the end, neither General Colin Powell nor Secretary Cheney was enthusiastic about the use of the stealth aircraft, but they relented to the request of the Joint Task Force South commander.[235]

In the end, the use of the F-117 was a total failure and completely unnecessary. The jets performed as tasked and put their munitions exactly where they aimed, but these actions had no effects on the Panamanian Defense Forces. One 2,000-pound bomb landed only 60 yards from the barracks, and the other landed 200 yards away. However, the effects were completely negligible. Panamanian troops fought for more than five hours and put up a fierce resistance.

[235] "Operation Just Cause," Joint History Office, Office of the Chairman of the Joint Chiefs of Staff, 1995, 31.

Worse, the backlash of using the F-117 was tremendous. Chairman of the House Armed Services Committee Les Aspin called its use "show biz" and said: "…not to be too facetious, but we were trying to miss the building. We have lots of planes that can miss buildings. There's no question that there could have been other planes chosen." Secretary Cheney explained immediately after the attack that the bombs had been dropped with "pinpoint accuracy," exactly where they had been aimed. The Air Force backed the secretary's assessment and stated in addition that the F-117 was used because there were doubts as to what type of air defenses the Panamanian Defense Forces had. When it was brought up in the print media that the Panamanian Defense Forces had no air defense system, the Air Force changed its story by saying that there had never been an absolute need to use F-117 but the aircraft had been chosen for its ability to bomb with unusually high accuracy. The Air Force was never able to provide a coherent answer as to why the F-117 was used in such a permissive, low-threat environment.[236]

The more the media dug, the more the Air Force dug in its heels. By April, however, the Air Force admitted that the F-117 had missed its desired point of impact by a few hundred yards. Reports in the *New York Times* and *The Washington Post* forced Secretary Cheney to order an investigation of the stealth fighter's performance. A report in the *New York Times* on 13 April 1989 stated that the Air Force was incapable of making up its mind why it had used the F-117. Many in the media saw the use of the stealth fighter as a publicity stunt to justify the purchase of the B-2. The Air Force didn't do itself any favors by continually changing its story in the early months of 1990. However, even in an environment where it faced no significant surface-to-air threat, the Air Force was able to gather enough data to know that at least the F-117 had worked in an operational environment. It was no longer a completely unknown quantity in combat.

[236] Operation Just Cause After Action Report, 1995, Air Combat Command, Tactical Air Command Files, Contingencies Files.

Still, two aircraft over Panama was very different from an entire squadron's worth of aircraft conducting major combat operations against an enemy determined to defend its homeland. [237] Air Force fighters, in an air-to-air role as a combat force, had yet to be tested beyond training exercises. Just Cause proved little for Strategic Air Command or Tactical Air Command and gave little evidence of areas for improvement or "lessons learned." Still, even in such a permissive environment, the Air Force used tactical aircraft capable of precise delivery rather than a strategic asset dropping weapons guided only by gravity. Training exercises and real world events showed that tactical assets were of more use in conventional conflicts than the aging B-52. Tactical Air Command supplied a rather paltry total of twenty F-15s and F-16s that provided air support, but at least the Army troops on the ground had no problem communicating with the Air Force pilots that provided air cover during the operation. The fighters intentionally stood in the way of any possible interference by Cuba or Nicaragua through the use of a combat air patrol, more commonly called a CAP. CAPs were practiced during Red Flags. Pilots were assigned a section of air space to protect from any threats that might appear, sometimes aggressors and sometimes not. The CAPs conducted by Air Force pilots during the invasion of Panama did not result in any air-to-air engagements but the pilots knew they were well prepared. The Navy's Fighter Weapons School, "Top Gun," and their participation in Constant Peg and Red Flag had already yielded results. Navy pilots could already tally several dogfights and air-to-ground engagements against Libyan aircraft and SAM sites.

The Air Force had other successes during Just Cause. Following the end of major combat operations and the capture of Manuel Noriega, a "Dear Boss" letter of a different sort from the one mentioned earlier dating from just after Vietnam was penned from the deposed Panamanian

[237] New York Times, 13 January 1990, 9; New York Times, 11 April 1990, 19; Washington Post, 11 April 1990, 21.

drug lord's desk. The letter was from an Air Force trooper attached to an Army ground unit. His mission was to serve as a liaison between troops on the ground and air power assets overhead. The letter written to his boss, who was in the U.S. at the time, indicated that the "jointness," or the ability of Army and Air Force units to work together, had been exemplary during the operation. This particular airman, a qualified parachutist, jumped into Panama with an Army Airborne unit, and he closed his letter with the line, "We are going to need a bunch of gold stars with little jump wings on them." The ability to operate in a joint environment was one of the major successes of Just Cause. Since the earliest days of aviation, ground units had not been able to rely on having support from air power overhead, at least not to the point that pleased commanders of troops on the ground. During Just Cause, however, it was never in doubt. In fact, the operation in Panama, despite the little it demonstrated about the future of air conflict, clearly showed that the 31 initiatives between Training and Doctrine Command and Tactical Air Command had led to some type of battlefield understanding. The Army no longer questioned whether it could expect close air support from the Air Force.[238]

Was Red Flag Working?

What did the application of American air power demonstrate to Air Force leaders at the time? First, Red Flag worked. It provided pilots the needed skills to survive in combat through training in realistic manner. As previously stated, the concepts and tactics tested at Red Flag proved operationally useful. Pilots also benefited from the Red Flag experience, and Moody Suter's theory that the first ten "combat missions" could be conducted in a training environment proved to have been correct. Second, technological advancements in stealth were ready for further operational use, even if their initial use was flawed in execution. The F-117's use in

[238] Operation Just Cause Collection, Air Combat Command, Tactical Air Command Archives.

Panama proved that the concept of stealth was sound for combat, even if the use of the aircraft there had negligible effects. Third, American tactical air crews were capable of long endurance flights in order to pull off a mission. El Dorado Canyon gave additional proof that tactical aircraft were capable of providing strategic-level effects. Finally, tactical fighters were capable of, if not yet successful at, producing strategic-level effects. Each of the engagements of the 1980s relied heavily on tactical air power to produce desired effects on the battlefield beyond the air-land battle doctrine. Due in large part to the success of Red Flag, and other realistic training exercises, Tactical Air Command aircraft were supplanting Strategic Air Command missions. In fact, before the 1980s ended, "tactical" and "strategic" had ceased to be useful terms when it came to air power. Now there was only theater air power, assets that conducted operations regardless of the major command to which they belonged.

Beyond the missions themselves, the tactical air force worked closely with the Training and Doctrine Command of the Army throughout the 1980s. The dialogue between Tactical Air Command and the Training and Doctrine Command that began in 1975 were an unheralded partnership between the two services not often seen. Problems for one were viewed as problems for both, and the development of the 31 initiatives in 1984 not only advanced the air-land battle doctrine, but also effectively demonstrated just how much the Army depended on Tactical Air Command's assets in any conflict. The symbiotic relationship that had developed in peacetime training between Tactical Air Command and the ground element was actually more important than the agreements themselves. The dialogues and discussions that occurred at the two bases located on the Virginia Peninsula focused more on shared problems and solutions than on inter-service infighting that was still so commonly seen inside the Pentagon. Strategic Air Command

remained conspicuously absent from these discussions, which only further alienated a command that was slowly losing its identity from the broader Air Force.

Beyond a shift from strategic to tactical air strategy, the 1980s showed a marked shift from the possibility of a conflict in the European theater t towards the chance of U.S. direct involvement in a conflict in the Middle East. By 1989, most civilian analysts of military affairs and military members tended to agree that a general war with the Soviet Union was unlikely. The Air Force made this conclusion as early as 1981 with the publication of *Air Power Entering the 21st Century*. The Air Force and the Army prepared for the far greater likelihood of an engagement in the Middle East with the Bright Star exercises conducted with Egypt. Events in the 1980s, from Libya to Panama, indicated that future conflict would not be with the USSR; smaller regional conflicts were far more likely. Even as American soldiers returned from deployments in Panama in early 1990, 8,000 miles away another dictator was planning to invade one of his neighbors to steal oil revenues to pay for his war against another neighbor. Saddam Hussein had good reason to believe the United States would not interfere in dealings among Arabs. He also had good reason to believe that, if conflict did come, his Soviet and French-style integrated air defense system and technologically advanced fighter force could withstand the challenge. On both points he was wrong.[239]

[239] "Air Power Entering the 21st century: An Air Force Report," 1FW archives, 2

CHAPTER 6 - Desert Storm: A Theater Air War

The Red Flag exercise was created to prepare combat pilots for a conflict like Desert Storm. Speaking on the importance and contributions of aviation during World War I, historian Malcolm Smith stated: "One would search in vain to discover instances in which they dramatically affected the course of battle or campaign." Eighty-three years later, at the conclusion of the Persian Gulf War, authors and proponents of air power tripped over each other in their attempt to locate the most hyperbolic phrase to describe all that air power had single-handedly accomplished in a few weeks. Too often the hyperbole employed focused on the machines rather than the men who flew them. The tactical Air Force was not only better equipped with technologically advanced aircraft, but it was also better prepared and its pilots were better trained to engage an enemy in the air and on the ground. The change in training beginning in 1975 allowed the Air Force, especially the tactical fighter pilots, to dominate the conflict on an unprecedented level. This chapter will also show that Desert Storm was unlike any previous air campaign in history and not because of its strategic nature, but rather because when viewed in its entirety, the air campaign something new in its conception and execution. It was a theater air war where the notions of tactical and strategic didn't matter. The air campaign also depended greatly on the massive accomplishments that occurred in realistic training during the 1970s and 1980s.[240]

In 1968, General Creighton Abrams had stated, "B-52s are not like [Tactical Air Command] air….You know, they've got big bombs. They've got 3000-pound bombs they're carrying and so on. It's just capable of doing something which none of the rest of them can

[240] Malcolm Smith quoted in Lee Kennett, *The First Air War 1914-1918*, 220.

hack." The training revolution that began in the 1960s and matured under exercises including Red Flag were poised to change this statement completely. In January 1991, changes that had occurred at Red Flag were applied and conceptions of air power to which the Air Force had clung for five decades changed forever.[241]

Saddam Hussein's invasion of Kuwait offered the perfect opportunity for U.S. Air Force operators to meet national policy objectives through the use of tactics and doctrine that had been perfected during the previous decade and a half. Red Flag, Maple Flag, Green Flag, Bright Star, and numerous other large-force employment exercises had prepared American airmen well for the enemy they were going to face in combat, primarily in the first few days of Operation Desert Storm. While technological marvels such as the F-117 had a direct impact on combat operations and an even larger one on the perceptions of the military among the American media and American people, it was the pilots in the multi-role fighters and, to a much lesser extent, bombers and special operations aircraft that ensured air superiority and thus an unhindered freedom of maneuver for the land component forces.

For the Air Force, Desert Storm represented a fundamentally different way of conducting war. Tactical aviation was at the forefront. Tactical fighters gained air superiority early on. These same fighters searched for Scud missiles, performed suppression of enemy air defenses missions, and penetrated deep into enemy territory to attack strategic targets. Beyond these activities, traditional strategic assets, including the B-52, performed the tactical jobs of interdiction and close air support, leaving the strategic attack work to fighter aircraft. Many have dubbed the air war over Iraq and Kuwait a "strategic air war." In the purest use of the term, this is a misnomer. The air war over Iraq and Kuwait was actually a tactical air war that caused

[241] General Creighton Abrams, Oral History Interview, Air Force Historical Research Agency, 28 January 1968, K239.0512-231, ,10-11.

strategic-level effects. Everything about air power in the way it was traditionally conceived was overturned during Desert Storm. World War II taught the Air Force that the bomber would not always get through to its target, although this was not a lesson that the Air Force internalized or accepted when the war concluded in 1945. Ironically, the notion that strategic air power was supreme was strengthened and continued to dominate the Air Force's organization and structure. However, Vietnam proved that even a fighter getting through to the target was not a sure thing, either. The Air Force knew these simple facts and approached these problems differently during the air war in Desert Storm. Training between Vietnam and Desert Storm taught the tactical community how to mitigate these problems as much as possible. For example, Vietnam had clearly demonstrated that, in most scenarios, a pilot who was shot down had never even known that the enemy was there. The solution to this problem was simple: one of the first tasks to be accomplished on night one of an engagement should be the destruction of the ground control intercept sites. During training exercises at Red Flag, ground control intercept sites vectored enemy MiGs (aggressor F-5s and later F-15s and F-16s) towards unsuspecting Americans to simulate attacks by an invisible enemy. During Desert Storm, this knowledge was used as an advantage against the enemy.

Saddam Hussein had good reason to believe that no countries from the international community, much less the United States, would interfere with his occupation of Kuwait. Historical examples from the past decade, including Eagle Claw and the bombing of the Marine barracks in Beirut, indicated to him that the U.S. was in no position to, nor was it willing to, engage in warfare in the Middle East. He also believed that if conflict did come, his military and air arm were up to the challenge of taking on the U.S. military. He was wrong on both counts. After the war was over, a debriefed Iraqi general described Hussein as "a gambler who did not

understand either the friendly or enemy situation, with the result that he led his military establishment to disaster." He might be forgiven, though; no one including the Soviet Union fully understood just how much the conception of aerial warfare had changed since the Air Force began its training revolution after the Vietnam War.[242]

The national objectives laid out by President George H.W. Bush bear repeating since they directly impacted the creation of military objectives and prosecution of the conflict. The objectives included immediate, unconditional, and complete withdrawal of all Iraqi forces from Kuwait; restoration of Kuwait's legitimate government; security and stability of the Persian Gulf region; and, finally, protection of the lives of American citizens abroad.[243]

The air portion of the overall Desert Storm campaign found its genesis inside the Pentagon and, more aptly, was the creation of air power theorist John Warden. Warden's name, even in 2013, finds supporters and detractors inside the U.S. Air Force. He had spent years codifying his thoughts on operational-level employment. Mistakes earlier in his career prevented him from being promoted past colonel, and many have criticized him as not being a "true" fighter pilot although he had a proven combat record flying 266 combat missions as an OV-10 pilot during Vietnam and flew both the F-4 and F-15 after that conflict. The disconnect between Warden and many in the fighter pilot community was Warden's intellectual tendencies. Lieutenant General Buster Glosson said "Warden was a bright academician, but every time the Air Force gave him an opportunity to command he failed." Glosson also stated there was a clear "stigma" that followed Warden around in the "operational community." In other words, other

[242] "The Gulf War: An Iraqi General Officer's Perspective," Air Force Historical Research Agency, GWAPS, NA-22.
[243] Gulf War Air Power Survey Collection, Air Force Historical Research Agency, CHSH 1-2.

fighter pilots did not trust him. Yet Warden was a keen tactician who knew that tactical air power was the key to any conflict of the future.[244]

The Commander in Chief of the Central Command, General Norman H. Schwarzkopf, knew that Saddam Hussein might not stop at invading Kuwait and that it was necessary to have a plan in place should Iraq continue its aggressive actions. The off-the-shelf plan was Operations Plan 1002-90. Immediately after Hussein's invasion, Schwarzkopf asked Air Force headquarters, Strategic Air Command, and Tactical Air Command for options in case Saddam continued his rampage into Saudi Arabia. [245]

In April 1990, Warden personally reviewed the 1002-90 plan; he was less than pleased with some of its content. Warden unequivocally stated that the 1002-90 plan in its then current form was "…harmful to the best interests of the Air Force and will reduce the combat capability of the joint force as a whole." His largest complaints were related to the ambiguities inherent in the plan and the fact that it did not explicitly state that an air commander had overall operational control of all air assets in the theater. Warden worried that allowing a Navy commander or Marine to decide how much of their assets could be "apportioned" to an overall air campaign would lead to a repeat of Vietnam. In multiple sections, Warden's handwritten comments recommended that the wording be changed to indicate that all military services should "provide aircraft sorties to the [joint force air component commander] …." It wasn't that Warden felt the need for the Air Force to hoard all the aircraft in the theater, nor did he disagree with the Navy's

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[244] John Andreas Olsen, *John Warden and the Renaissance of American Air power* (Washington, D.C.: Potomac Books, 2010), 276-285; John A. Warden III, *The Air Campaign: Planning for Combat*. Washington, D.C.: National Defense University Press, 1988, 193, Buster Glosson, *War With Iraq: Critical Lessons* (Charlotte, NC: GFF Press, 2003, 16.

[245] In 2002, Secretary of Defense Donald Rumsfeld changed the title of the area commander in chiefs to "combatant commanders." Thus, the commander in chief of the Central Command became commander, United States central commander. The term commander in chief became reserved exclusively for the commander in chief of the United States military, the president, as outlined in Article II, Section II Clause I of the United States Constitution; Associated Press, "Rumsfeld declares CINC is Sunk," 29 Oct 2002,.

need for fleet defense or the Marines' view as air as an organic flying artillery. Rather, he simply wanted to ensure that every possible sortie was best tasked to achieve the overall campaign objectives."[246]

Warden was a proponent of Red Flag and other training exercises and he knew that the realistic training that took place at Nellis could translate directly into combat in Iraq. In his book *The Air Campaign* (1988) he stated that "If something is going to be done in war, it ought to be practiced in peace." However, it was rather serendipitous that the request for help with the 1002-90 plan even made it to Warden's office in the first place. The subsequent story, famous inside Air Force circles, has been told many times over, but it bears repeating in condensed fashion here. At that time, the U.S. Air Force assigned many of its numbered air forces geographic regions in which they were tasked to respond during a conflict. Thus, they also needed to create and maintain contingency plans for those regions. The Air Force dubbed them "senior warfighting echelons." The Ninth Air Force, located at Shaw Air Force Base in South Carolina, was the numbered air force responsible for the Central Command region in the Middle East. Lieutenant General Charles "Chuck" Horner, the Ninth's commander, and his staff had been sent ahead immediately following the invasion in Schwarzkopf's absence to function as the Central Command forward headquarters. Thus, Horner and his entire staff had their hands full dealing with basing and beddown for the thousands upon thousands of soldiers, sailors, airmen, and marines pouring into the region as directed by the commander in chief.[247]

In Horner's absence at Shaw Air Force Base, Schwarzkopf called the Air Force chief of staff to ask for planning help. As it turned out, General Michael Dugan was on leave, and the

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[246] Memo from John Warden, "Review of USCINCCENT Plan 1002-90," Air Force Historical Research Agency, Desert Storm Files, NA-239.
[247] John A. Warden III, *The Air Campaign: Planning for Combat*, (Washington DC: National Defense University Press, 1988), 167

vice chief, General John Loh, received the call. Loh passed the request for help to both Strategic Air Command and Tactical Air Command commanders as well as the deputy chief of staff for plans and operations, Major General R. Minter Alexander. Alexander, in turn, passed the request for information to Colonel John A. Warden. Loh also contacted General Dugan, who approved of Warden's involvement. Dugan was familiar with Warden's National War College thesis "The Air Campaign." Dugan insisted that members of his staff read it and even hired Warden in 1989 to staff a new directorate on the Air Staff called "Warfighting Concepts." This branch is more commonly remembered for its far catchier name, "Checkmate." When Dugan received word that Central Command was seeking inputs for planning, he immediately passed it directly to John Warden's Checkmate cell. This was exactly the chance Warden needed to get his ideas about air warfare to the right people. As Air Force historian Richard Davis put it, "the man and the moment met and jumped as one."[248]

The name coined by Warden and his planners for the air campaign against Iraq was "Instant Thunder." The name served the dual purpose of connoting immediate results while directly repudiating the gradualism of Vietnam's Rolling Thunder campaign. In air power historian David Mets' view, "Warden asserts that the military technological revolution is here—that technical change has passed the dividing line between evolution and revolution, wherever that is." There is no clear line to denote where a natural evolution begins and a fundamental shift occurs due to a revolution. Why cannot both be true? The evolution of air power tactics and doctrine did not happen overnight. The training, equipment, and tactics used in Desert Storm took more than 20 years to form. In that sense, everything that occurred during the air war was but a natural execution of a continual evolutionary process. On the other hand, the Instant

[248] Richard Davis, *On Target: Organizing and Executing the Strategic Air Campaign against Iraq* (Washington, D.C.: Air Force History and Museums Program, 2002), 59.

Thunder plan and its subordinate plans were so conceptually and historically different from anything that had come before that, perhaps, the term revolutionary truly does apply. Again, Warden's contributions to the campaign plan fell in line with thinking that had been taking place in the tactical air force since Red Flag began. Warden's revolutionary plan was one already accepted by the tactical community as the way they had been training for war for more than a decade. [249]

Warden's plan stated that the "result of Operation Instant Thunder will be the progressive and systematic collapse of Saddam Hussein's entire war machine and despotic regime." It also closely mirrored a two-week Red Flag exercise. The plan was simple enough in theory but enormously complicated in execution. Warden planned to use tactical air power to selectively disable, destroy, or render inoperable key targets across five specific "centers of gravity." These were leadership, key production, infrastructure, population, and fielded forces. Each "ring" around the centers of gravity in Warden's plan had many objectives associated with them to isolate and separate them from Hussein's ability to maintain control. Each individual objective had additional locations that needed to be attacked, and each location had dozens of independent targets that would need to be attacked. The attacks would need to occur along a very short timeline to cause a paralysis from which Hussein would be unable to recover and retaliate in an effective manner. In total, there were thousands of targets. Warden's plan would use every asset available to be flown into the theater and called for both kinetic and non-kinetic options to deal with each target set. The plan was visionary; nothing like it had ever been attempted before.[250]

The Instant Thunder plan as presented to the Chairman of the Joint Chiefs of Staff, Secretary of Defense, and Commander in Chief of the Central Command was a four-phase

[249] David R. Mets, *The Air Campaign: John Warden and the Classical Air Power Theorists*, 77.
[250] "Proposed Iraq Air Campaign, Operation Instant Thunder, a Strategic Air Campaign against Iraq to Accomplish NCA Objectives," Air Force Historical Research Agency, GWAPS, CHSH 1-2.

operation. Phase I was the "strategic" campaign. Although strategic in nature and results, the campaign was in actuality a massive tactical offensive. Phase II was planned to be executed concurrently with Phase I and called for the suppression of enemy air defense systems. Phase III included air attacks on ground forces in and around Kuwait. The final phase was providing support to the ground offensive.[251]

Phase I focused on strategic targets inside Iraq to destroy that country's offensive air capabilities, destroy national-level command and control centers, and disrupt internal control mechanisms. To the fighter pilots who would fly the missions it was exactly the way they had trained at Red Flag. Since Iraq's systems had multiple layers of redundancy, this phase called for hundreds of targets to be destroyed in the first six days to ensure separation of the national leaders of Iraq from the fielded forces. One of the mechanisms to accomplish this aspect of the plan would be disruption of the electrical power inside Baghdad. Warden believed that, in total, it would take six days and more than 4,000 sorties to accomplish Phase I, and he anticipated the loss of at least 40 aircraft, well more than an entire squadron of planes and air crews. Four phrases were repeated over and over in the planning materials: destroy, disrupt, neutralize, and isolate.[252]

Warden's Instant Thunder concept was not all that different from other contemporary doctrine in 1990. The dominant doctrine in the Army in the early 1990s was AirLand Battle, as laid out in Army Field Manual 100-5 *Operations*. Although AirLand battle was meant to defeat an offensive Soviet force and not a defensive force, there was the fear Saddam would either begin another offensive on his own or make offensive moves in response to an allied counter-

[251] "Strategic Air Campaign to Accomplish NCA Objectives in Iraq," Air Force Historical Research Agency, GWAPS, CHSH 1-9. no date.
[252] "Strategic Air Campaign to Accomplish NCA Objectives in Iraq," Air Force Historical Research Agency, GWAPS, CHSH 1-9, no date.

invasion. Since AirLand Battle was an Army doctrine, it was not codified in any Air Force doctrinal document. Thus, the Air Force was not required to honor or abide by it. The AirLand Battle doctrine called for deep strikes to interrupt and destroy the enemy's echelon forces. The Air Force referred to these strikes as interdiction and the concept had existed for over forty years at this point. Pete Quesada made extensive use of these strikes preparing for and during the invasion of Normandy. The central point, by whatever name, was to reach deep into enemy territory and prevent these enemy troops or aircraft from providing support to the engaged leading echelons at the battlefront. AirLand Battle called for gaining and maintaining the offensive and refusing to cede that initiative to the enemy. It married the Clausewitzian concept of violent attack with B.H. Liddell Hart's concept of the indirect approach. Warden was a student of Liddell Hart's concepts, and he successfully used his knowledge of air power to form a strategic-level plan of attack using the same concepts the Army was espousing at the time. Warden's concept of Instant Thunder was not in opposition or contradiction to Army doctrine; rather, it was a continuation and an extension of AirLand Battle. Warden simply took it to another level by using air power as a maneuver force to create violent effects using "…surprise, speed of attack, flexibility, and audacity." It was Army doctrine applied to tactical Air Force assets.[253]

Rather than focusing entirely on the fielded forces, including the rear echelon forces, Warden included other centers of gravity and key nodes to enable maintaining the offensive. Warden's plan was heavy on offensive operations, something Army personnel recognized and enjoyed; Warden's concept of operations was similar Army-style maneuver warfare for the air assets. From a certain point of view, Warden took Army doctrine, overlaid an airmen's

[253] John L. Romjue, "The Evolution of the AirLand Battle Concept," *Air University Review*, May 1984; Clausewitz, *On War*, 89; Thomas Hughes, *Over Lord*, 149-155

perspective on it, and improved it. In a sense, Army doctrine enabled Air Force operations and not the other way around. It was an audacious plan; it was also a concept of operations that senior Army leadership could get behind, particularly the Commander in Chief of U.S. Central Command, General Norman Schwarzkopf.

On 10 August 1990, Colonel Warden, along with Lieutenant Colonel Bernard Harvey, briefed General Schwarzkopf on Warden's concept of operations for a strategic air campaign against Iraq. Also in attendance were Deputy Commander in Chief of the Central Command Lieutenant General Craven C. Rogers and J-3 Operations Director Major General Burt Moore. In his autobiography, Schwarzkopf said that he was pleased with the briefing and told Warden, "Good enough." Meeting notes from that day have the general shouting, "Shit, I love it!" Schwarzkopf went on to give his "100 percent" approval to the plan, and he told Warden, "You have restored my confidence in the United States Air Force." The general then told Warden's team to press on with further planning since the Central Command Air Forces commander was busy with the flow of forces into the region. Schwarzkopf stated, "[Central Command Air Forces] can't do planning. Their commander and vice commander are gone, and the staff is trying to flow forces. Do it where you want. It's up to the Air Force." Schwarzkopf's blessing for the Air Staff to plan the campaign for Central Command Air Forces set off a chain of events that became legendary inside the Air Force. Although the plan was approved by the Commander in Chief of the Central Command, Warden still had to take his concept to Saudi Arabia and brief the Central Command Air Forces commander. In essence, the four-star general blessed a plan that his three-star general in charge of executing air operations had never seen. Between Colonel

Warden's intellectual mindset and Lieutenant General Horner's displeasure that, as he saw it, the Air Staff was interfering with his operation, a disagreement was bound to ensue.[254]

Colonel Warden and General Horner, along with all the pilots on their respective staffs, were veterans of numerous Red Flag exercises, but this shared training experience did not put Horner and Warden on the same page with regards to the operational plan. The confrontation between Warden and Horner is famous within the Air Force. Numerous works carry a detailed description of the actual briefing Warden presented and how it drastically spiraled out of control. On the surface, Horner and Warden had much in common. For example, both were Vietnam veterans who had taken the tough lessons learned there to heart. Both were fighter pilots, and both were well educated in military schools and public institutions. Often erroneously, Horner was described as a non-intellectual compared to Warden, even though Horner held an MBA from the College of William and Mary. In reality, though, the confrontation was just a disagreement between two very different individuals. A certain amount of inevitability has been ascribed to the battle between the two, which has been billed as the intellectual versus the warfighter, the visionary versus the pragmatist. If the meeting between the colonel and the lieutenant general was doomed to fail for any reason, it was the preconceived notions about the other person that each brought into the room. Warden had a reputation as a lightning rod for attracting criticism. Warden also had a reputation as an intellectual and not as a leader of men. His operational commands at the wing level had not gone well, and it was known that his chances for achieving

[254] In his autobiography, Schwarzkopf states the meeting took place on 16 August, but multiple documents show that the Warden briefing took place on 10 August. Norman H. Schwarzkopf with Peter Petre, *It Doesn't Take a Hero* (New York: Bantam Books, 1992), 318-320. Extract of meeting notes at Instant Thunder brief to the United States commander in chief of Central Command, Air Force Historical Research Agency, GWAPS, 10 Aug 1990.

brigadier general at the time were slim. On the other hand, Horner was a self-professed "knuckle-dragger" who had a reputation as a tough commander.[255]

On the afternoon of 20 August 1990, Warden and his staff entered the Central Command Air Forces briefing room to lay out Warden's concept for air operations in Horner's theater. The briefing did not go well from the beginning. Horner felt there was a lot of unnecessary "boilerplate" at the beginning of the presentation and began to rush Warden through his slideshow. Horner also resented the fact that an Air Staff officer from somewhere deep in the bowels of the Pentagon was standing in front of him, in his theater, telling him how he should conduct air operations that he was responsible for planning and executing. Conversely, Warden thought the general was rushing him through important concepts and was not listening to his main points. Warden began to think that Horner simply was not grasping the plan as a concept of operations that could be molded to fit his needs. Warden also thought Horner was myopically focused on the destruction of enemy ground troops rather than the separation of Saddam Hussein from his ability to command and control. Nearly two hours into the session, Warden inadvertently lectured Horner on his focus on enemy ground troops. As Lieutenant Colonel Dave Deptula stated, "You could have heard a pin drop." The briefing ended, and so did any chances that Warden would be asked to stay behind and help plan for the war. However, three of his deputies—Lieutenant Colonels Dave Deptula, Bernard Harvey, and Ronnie Stanfill—were asked to remain. The three bade Warden farewell and immediately dubbed themselves "the exiles."

The member of Warden's staff who rose to the most prominence during the campaign was the young Lieutenant Colonel Dave Deptula, a graduate of the University of Virginia. When

[255] For a detailed description of what is simply referred to as "the confrontation" see: John Andreas Olsen, John *Warden and the Renaissance of American Air Power*; Diane Putney, *Air Power Advantage: Planning the Gulf War Air Campaign*; Edward Mann, *Thunder and Lightning: Desert Storm and the Air power Debates (Maxwell AFB, Ala: Air University Press, 1995).*

Warden was unceremoniously tossed out of Saudi Arabia, Lieutenant General Horner asked Deptula to stay behind and lead the planning effort. The plan might have been Warden's, but it was left to Deptula to bring it to fruition. The shaping of the Instant Thunder campaign was done under the watchful eye of Major General Buster Glosson, a former commander of the Fighter Weapons School. When Warden left, Glosson became the principal architect under Horner, and Deptula became the site manager for targets in Iraq.

Some personnel at Tactical Air Command thought that they should be planning the air portion of the campaign. After all, the Ninth Air Force fell under Tactical Air Command during peacetime, so, if the Ninth Air Force was going to conduct aerial operations as the warfighting lead during a conflict, it was only fitting that Tactical Air Command should be involved, despite doctrine being to the contrary. Tactical Air Command's plan differed from Instant Thunder in nearly every regard. In fact, it harkened back to Rolling Thunder with its clear emphasis on escalatory actions. Tactical Air Command proposed a plan that was more concerned with sending a message than destroying Iraq's military. However, much like Vietnam, the main problem with the plan was that the leaders at Tactical Air Command did not clearly define what signals to send. The plan focused exclusively on destroying Iraqi ground targets in Kuwait. It did not focus on strategic, operational, or even tactical targets deep inside Iraq.

How did different segments within the Air Force come up with such drastically different plans? If Vietnam had truly affected the Air Force as an institution, and if so much time, money, manpower, and lives had been sunk into Red Flag and other realistic training programs, why was Tactical Air Command, of all Air Force commands, prepared to relive past mistakes? The answer is simply a lack of vision. Warden, Deptula, and others had the vision. They proselytized their plan and won converts including Schwarzkopf, Powell, and even, to a lesser

extent, Horner. They presented a plan so fundamentally different from anything that had ever been attempted before, yet it was simple in its approach: cut off the head and destroy the body. The appeal of Instant Thunder was that it actually aligned with the simplest concepts of warfare: kill people and break things. The difference was that Instant Thunder planned to destroy Iraq's military capability with speed and lethality and across the entire theater at the same time. If the Instant Thunder plan was going to be successful, it required the best trained pilots in the world to carry it out. The U.S. Air Force, as well as other military service components, had spent fifteen years working to achieve exactly that.

The Iraqi Threat

The Iraqi military, especially its air force was not beaten because it was technologically inferior or because it was inept. More than any other reason, the Iraqi military was simply not as well trained as the American and allied forces they faced. Most American pilots had participated in dozens of Red Flags. Twenty years of hindsight, in addition to some declassification of documents related to planning Operation Desert Storm, allows a new look at the threat posed by the Iraqi military after its invasion of Kuwait. Much has been written in the past two decades about the ineptitude of Iraqi leaders and the unwillingness of Iraqi soldiers to face the American military, but these works do not give due credit to the Iraqi military machine in the winter of 1990. The strategic depth of the Iraqi military was considerable. A brief given as part of the planning of the air campaign stated that Iraq's communications systems were the best in the third world with seven levels of redundancy. That meant that Iraqi commanders had numerous electronic routes of communication to be able to contact troops in the field; to truly separate Hussein from the fielded forces would necessitate the destruction or degradation of dozens of targets in a small amount of time. In addition to a highly modern communications system, the

Iraqi air defenses and air force were among the best in the third world. A country the size of California, Iraq had twenty-five national command facilities built out of state-of-the-art bunkers and fifty-four airfields containing the most modern Soviet- and French-built weapons systems.[256]

Iraq's French-built integrated air defense system was superb and comparable to those of Warsaw Pact nations. The French called it KARI (Iraq spelled backwards in French). The air defenses around Iraq's major cities were denser than the same threats American pilots had faced in Vietnam. In 1990, Iraq had more than 10,000 surface-to-air missiles composed of a mix of both high- and low-altitude missiles. However, the threat to aircraft operating below 10,000 feet was significantly higher and was an issue that would plague air operations early in the war. The Iraqi air defenses also posed a significant threat to large, slow-moving bomber aircraft. Initial planning documents for the air campaign demonstrate that there was considerable consternation about where to fly the B-52s, even when launching cruise missiles from a standoff distance. Few places in the sky over Iraq were safe for the bomber to fly without fear of being shot down. This also held true for the AC-130 gunships that were planned to support special operations ground forces. The surface-to-air missiles also posed a significant threat to fighter aircraft operating at all altitudes, but especially those above 500 feet and below 10,000 feet. The suppression and destruction of the enemy air defenses were of primary importance to the air planners. Vietnam, Red Flag exercises, and the Thirty-One Initiatives signed in 1983 all indicated that gaining air superiority was priority one for the Air Force, and to do that the enemy's air defenses had to be significantly degraded. If possible, the ground control sites needed to be destroyed to ensure at the least that surface-to-air missile sites would be forced to operate autonomously.[257]

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[256] An extract of the Strategic Air Campaign briefing, Air Force Historical Research Agency, GWAPS, CHSH-1, no date

[257] An extract of the Strategic Air Campaign briefing, Air Force Historical Research Agency, GWAPS, CHSH-1, no date; An AC-130 gunship was shot down by a surface-to-air missile on 30 January 1991,

The Iraqi Army was capable of joint service multi-corps offensive operations and sustained defensive operations, and its strength was a considerable threat. More than 2 million men made up the total Iraqi forces across all branches, which represented 75% of the country's adult male population between the ages of eighteen and thirty-four. A thought often attributed to both Mao Tse Tung and Joseph Stalin represented Hussein's conception of military operations: that quantity has a quality all its own. The Iraq-Iran War proved that the Iraqi military could fight to at least to a stalemate, and the Iraqi military had defended against multiple offensives by the Iranian Army for eight years while being dispersed across a much larger frontier than the border between Saudi Arabia and Kuwait. The battle lines in the Iran-Iraq War stretched across more than 730 miles. In retrospect, defending its defensive positions in Kuwait should have proven much easier for Iraq than defending the longer border between Iraq and Iran.[258]

The Iraqi Air Force was equal in many ways to the allied armada arrayed against it. In rough numbers, the allies had between 700 and 800 combat aircraft to Saddam's 750 to 800. Some have indicated that the bulk of his force was made up of Vietnam-era MiG-21s, but this obfuscates the fact that the Air Force and Navy also flew Vietnam-era aircraft in large numbers, including the F-4 and F-111. Furthermore, decades later many countries continue to fly the MiG-21 and just update the aircraft's avionics package occasionally. It remains a potent adversary for anyone who would overlook it. Beyond the MiG-21, the Iraqi Air Force also flew MiG-23s and MiG-29s, both with look-down shoot-down capabilities; in addition, the Iraqis flew the French-built Mirage F-1s. Certainly, the allies had very sophisticated aircraft, but this does not justify underestimating the very capable MiGs, Mirages, and other aircraft, especially if the

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killing all fourteen crewmembers, which proved the surface-to-air missile threat was a potent one for anything other than a tactical-level fighter in certain areas over Iraq.

[258] An extract of the Strategic Air Campaign briefing, Air Force Historical Research Agency, GWAPS, CHSH-1, no date.

Iraqi Air Force had been ready to meet the allies on the first night of the operation; another advantage of the allies was the ability to conduct prolonged operations during periods of darkness. In technological sophistication and age, the aircraft of the two sides were equal in many respects.[259]

Air Force historian Richard Davis' took an unflattering view of the Iraqi Air Force: "…the Iraqi Air Force possessed inferior aircraft and inferior pilots, all in inferior numbers, with weapon systems that were an open book to their opponents." But this perspective must be disputed. Davis view is that Iraq's defeat can be attributed primarily to their inferior status as an opponent. Iraq was a very real threat. First, Colonel John Warden described the Iraqi Air Force as "battle hardened and very good." Ranked by size, it was the sixth-largest air force in the world. The Iraqi Air Force (IQAF) flew modern Soviet- and French-built equipment. Second, the average age of those aircraft was comparable to the average age of American aircraft. Third, for years the Soviet Union had sent advisors to Iraq to teach its pilots to fly Soviet-built aircraft. On the readiness of the flyers opposing the United States, one Soviet advisor said, "I feel the Iraqi fighter pilots were trained just as well as the pilots of…France and Finland with whom in recent years we have been in contact repeatedly." Finally, the Israelis urged the Americans not to underestimate the quality of the Iraqi forces, and Israel isn't known for making hyperbolic statements. [260]

The only way to defeat Saddam's Air Force was in a head-to-head confrontation. In the twenty years since Desert Storm, much study has been devoted to the importance of stealth technology and the F-117. Certainly the F-117 offered tangible results against Iraq's

[259] Diane Putney, *Airpower Advantage*, 92; Richard Hallion, *Storm Over Iraq*, 146-147.
[260] Richard G. Davis, "Decisive Force: Strategic Bombing in the Gulf War," Air Force History and Museums Program, 1996; AFHRA, Desert Storm Files, Gulf War Air Power Survey New Acquisition Files, Pravda Komsomolskaya, "Former Soviet Advisor Describes Experiences in Iraq," 23 February 1991.

communication nodes and the country's ability to command and control, but it offered nothing towards the defeat of the Iraqi Air Force. That job fell to the non-low-observable aircraft, the F-15s, F-14s, F-18s, and other fighter aircraft. These pilots were weapons school graduates and veterans of dozens, if not hundreds of missions, flying over the Red Flag training area.

Beyond the aircraft and air crews, the Iraqi bases were also very modern. Another Soviet advisor commented in 1990 that "the equipment, the shelters and blast walls—everything was the last word of equipment and outstanding quality… It would have been virtually impossible to destroy this with tactical weapons, even super accurate ones." Two fundamental differences separated the Iraqi Air Force from the allied one facing it. The first was training. The American and allied forces were simply better trained and prepared to execute air operations against the Iraqis, even considering how many of the Iraqi pilots were combat veterans. Second was the Iraqi Air Force's overreliance on ground-controlled interception. As fixed targets, if they could be destroyed, Iraqi doctrine and the means of employing it would be thrown out the window. Conversely, the allies relied heavily on airborne warning and control aircraft flying well out of range of surface-to-air missile sites, yet close enough to direct the air battle and provide early identification of enemy aircraft which provided allied pilots an advantage not possessed by the Iraqi Air Force.[261]

Final Operational Plan

The final operational plan was built by Red Flag and Blue Flag veterans. The staffs of the 9th Air Force, the HQ Air Force planners were well versed in how to conduct combat operations. In the previous year, the CENTAF staff had participated in the Blue Flag command and control exercise. CENTAF planners used the recent Blue Flag results, predicated on a

[261] Komsomolskaya Pravda. "Former Soviet Advisor Describes Experiences in Iraq." 23 Feb 91

Middle East conflict, to help prepare the target list. The way the Air Force went about planning for this war had been inculcated through years of training. Instant Thunder was the initial conception for air operations against Iraq, and, while much of that plan remained present during the planning process, it was melded into Operation Plan 1003-90. While Warden and his planners deserve much credit for the air portion of the campaign, 1003-90 laid out the requirements not just for air, but the maritime and land portion of the campaign as well. One of Horner's major critiques of the Instant Thunder plan was that it was not executable as presented. Lieutenant Colonel Deptula and other members of the exiles from the Checkmate team now fell under the supervision of Major General Buster Glosson and they were seamlessly integrated with Central Air Forces personnel to change the conceptual plan into one that could be executed. Deptula led the team focusing on the targets inside Iraq. Inside Central Command Air Forces headquarters, the air planners who worked on turning Instant Thunder into an executable plan worked in a vault that went by the nickname "The Black Hole," ostensibly because once someone went into the planning room, he or she never came out again.[262]

The operational plan that the coalition air planners developed from Instant Thunder had two primary tasks that had to be accomplished before any other attacks could follow. First, the coalition intended to seize air superiority as quickly as possible. One of the means to do this and leverage a bit of asymmetric advantage against Iraq was to launch the campaign under cover of darkness. If the coalition aircraft had technological advantages such as better radars and other

[262] Richard Davis, *On Target*, 11; Diane Putney, *Airpower Advantage*, 18, Blue Flag 90 was based on Soviet push through Iran but it helped identify lines of communication and other targets that needed to be destroyed.

electronic indicators, they also had pilots, especially in the case of the Americans, who could fly at night, something the Iraqis were capable of but far from proficient in doing.[263]

The second precondition was paralyzing and isolating the Iraqi leaders, primarily Saddam Hussein, and the command structure from the fielded armies and air force bases. Deptula and his colleagues planned to accomplish this by striking simultaneously at Iraq's most crucial centers of gravity. The attacks against these centers of gravity were a clear holdover from the Instant Thunder plan and provided a baseline from which to turn concepts into target sets. The three most important target sets were the National Command Authority; the nuclear, biological, and chemical warfare capability; and the Republican Guard divisions, the communications links among these targets and their ability to pass information had to be severed first. This approach differed significantly from Warden's original plan, which did not provide as much air power against the fielded armies.[264]

As the air campaign plan changed and increased in both size and scope, the number of targets proliferated as well. Since thousands of targets had to be destroyed, the Allies needed some sort of new element to determine a particular target's priority, when it should it be hit, and by what asset. Deptula devised a way to rank order the thousands of air tasks that needed to be accomplished. Each target was assigned a rank order on the joint target list. The rank order was decided by how each particular target contributed to taking out Saddam's ability to command and control and his ability to wage war against the allied forces. The prioritized target list was Deptula's creation, and therefore very much "air-minded," and the criteria for assigning a rank order to each target depended on where it fell it meeting the goal of the previously mentioned

[263] George Washington University Desert Storm Archive, Final Report to Congress, Conduct of the Persian Gulf War, 140, http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB39/#docs
[264] George Washington University Desert Storm Archive, Final Report to Congress, Conduct of the Persian Gulf War, 140, http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB39/#docs

target sets. The more important the target, the higher it appeared on the list. The more likely that a target precluded the ability to gain air superiority (SAMs and aircraft), the higher it appeared on the list. The targets were then divided into an overall flow for the entire campaign. Deptula called it the Master Attack Plan. The Master Attack Plan was then broken down into daily tasks. Each day's targets were published on an air tasking order, which told individual units what targets to hit at what time down to the specific point a weapon was supposed to collide with the target, also known as the desired mean point of impact or DMPI for short. Beyond the air tasking orders, there were air control orders, special instructions, and notices to airmen that had to be sent out to each unit. The overall process ran on a continuous forty-eight-hour cycle. Once the war began, attacked targets had to be assessed afterwards to determine if the goal of destruction or degradation was met. If a strike was deemed successful by the black hole and CENTAF planners then the target was removed it from the prioritized target list; if not, the target would be re-tasked on the next cycle's air tasking order. Some targets would be easier to assess than others. On the first night when the lights in Baghdad went out on national TV, it was known that the strike against the city's power grid had been successful. In other cases, it would take time for an aircraft to return to base and for intelligence personnel to review its tapes before the Air Force could determine whether the strike had been successful. [265]

The initial Instant Thunder plan had only eighty targets. By the time the final plan was in place, nearly 600 individual targets had been identified and laid out on a series of planning maps pinned to the walls of the Black Hole. Iraq was parceled from a single monolithic entity into four separate sectors: northern, western, southern, and central. These sectors airfields were laid out, as were radar sites; ground-controlled interception sites; known surface-to-air missile

[265] Diane Putney, *Airpower Advantage*, XX; George Washington University Desert Storm Archive, Final Report to Congress, Conduct of the Persian Gulf War, 140-145, http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB39/#docs

positions; known Scud missile sites; chemical, biological, and nuclear sites; and Republican Guard units. On top of this map, ingress and egress routes were identified, as well as tanker tracks and airborne warning and control system orbits. The maps laid out for the first night of the war based on wave by wave of aircraft. When one looks at the map labeled "0030-0120," the striking thing is just how many tactical aircraft were expected to pour into Iraq on that first night, and not just into the southern and western sectors closest to borders of Saudi Arabia and Kuwait. Tactical assets were used strike all across Iraq. Contrary to the technological enthusiasts' statements after the war, the workhorses on night one were not the F-15s or F-16s, or even the important F-117s. The dominant tactical aircraft entering Iraq on night one were the Vietnam era FB-111 fighter bombers, the same aircraft that proved so successful during El Dorado Canyon in 1986..[266]

The most important concept used by the air planners in the fall and winter of 1990 was their reliance on *precision delivery* and not on exclusive use of *precision munitions*. After the war the focus was on the latter, primarily because of the Air Force's use of weapons system videos of F-117s shown to the media and the general public. However, the former had much more influence on the planners than did the precision-guided munitions. Tactics learned at Red Flag and continuation training at home station location taught the pilots the importance of releasing their munitions at the precise moment where physics would cause the weapon to hit a specific location. Long before the days of GPS guided weapons, the air planners were reared in a culture where they trained to deliver "dumb bombs" to precise points on the Earth. The two systems are based on very different concepts and each reveals a very distinct ethos. Precision munitions rely more heavily on technology as the means of executing the operation. In that case, the bomb or missile becomes the focus of the "how" in accomplishing the mission. It simply

[266] Black Hole Air Campaign Maps, Air Force Historical Research Agency, GWAPS, NA-302.

becomes a matter of getting an aircraft close enough to allow the bomb to do the work. It is a much more technological approach to warfare – and this was not how the air planners approached the coming conflict. Precision delivery, on the other hand, is the more human-based approach to weapons employment. It relies on the manned aircraft to deliver the munitions precisely where the human pilot wants them to be delivered. The human element was the more important force during Desert Storm. A pilot's ability to deliver a weapon was based on years of tactical training and studying techniques and procedures to become familiar enough with his weapon system to conduct a mission proficiently time and again. The preference on precision delivery versus precision munitions demonstrated just how much of a profound effect Red Flag and other training exercises had on the planning and execution of the Gulf War.

By the beginning of 1991, the plan to attack Iraq was in place, as were the hundreds of assets that would be used to execute it. Most of the pilots in the region had spent months preparing for the coming conflict. They had studied the ingress and egress routes. They continued their continuation and upgrade training, practiced dogfighting, honed their skills, and familiarized themselves with the local area. They held briefs, listened to their weapons officers, and prepared mentally for what was to come. Their leaders knew that the younger pilots, those who had not served in Vietnam, were better trained than they had been and were better prepared to face combat on the first night than the elder pilots had been on their first mission down Route Pack 6 in Vietnam.

On 15 January 1991, President George H.W. Bush issued National Security Directive Number 54. Through that directive, the president officially informed members of the National Security Council that in the Persian Gulf the "United States remain[ed] committed to defending its vital interests in the region, if necessary through the use of military force, against any power

with interests inimical to our own." To that end and citing the twelve United Nations (UN) resolutions related to Iraq that had been issued since 2 August 1990, the president authorized "military actions to bring about Iraq's withdrawal from Kuwait." The president officially established four clear, concise, and attainable objectives for the military to achieve. On 16 January 1991, the first air tasking order was sent to the wings and, in the age before secure wireless communications capable of transferring the large file sizes of the ATOs, boxed up and flown to the aircraft carriers in the Persian Gulf. That night, the pilots stepped into dozens of briefing rooms all over the Persian Gulf region. In the early morning hours of 17 January 1991, the theater air war began.[267]

[267] Operation Desert Storm online archive, George Washington University, NSD 54, 15 January 1991.

CHAPTER 7 - Desert Storm: Execution

The planning for Operation Desert Storm relied heavily, although not exclusively, on tactical air power. To say that tactical air power worked alone would be folly. Hundreds of other aircraft enabled the tactical assets to perform their missions. Each mission type—including aerial refuelers, search and rescue assets, airborne warning and control systems (the E-3 AWACS), and joint surveillance target attack radar systems (the E-2 JSTARS)—could each fill a book, not to mention the Army rotary wing and the tactical naval assets that contributed heavily to the overall air campaign as well. However, Desert Storm planners intended to use tactical assets for the bulk of the attack. It is important to note that rarely in the history of aerial warfare was there such reliance on theater air power. Certainly, other campaigns had used tactical air power as the primary air asset to secure a ground victory, for there can be no overall campaign without some form of boots on the ground. The Third Reich in the blitzkrieg across Europe relied heavily on tactical assets, as did the Japanese expansion in the Pacific. General Pete Quesada's tactical air power provided critical, if often forgotten, aid during the Normandy campaign of World War II. Desert Storm was the first air campaign during which the tactical assets operated across such a wide spectrum of mission types and did so successfully. Just as important as tactical air power's contributions was the relatively little amount of strategic assets used to accomplish missions. Most importantly, though, the tactical fighter pilots, the combat Search and Rescue crews, those who flew refueling aircraft and even the AWACS crews

providing command and control had all conducted similar missions before at numerous Red Flag exercises.[268]

Admittedly, Vietnam relied heavily on tactical aircraft for interdiction and strategic attack, but Desert Storm demonstrated a pronounced maturation of these mission types combined with better trained air crews. This final point cannot be emphasized enough. The airmen who fought during Desert Storm were by and large not veterans of combat. The youngest Vietnam veterans who remained had achieved the rank of wing commander or higher; most of them were general officers. However, the group and squadron commanders, flight leads, and other pilots were far better prepared for their first combat missions than their superiors had been when they entered combat in the 1960s and 1970s. Fifteen years of Red Flags were about to be put to the ultimate test of efficacy and effectiveness. For all the technological advancement of aircraft and supporting systems, including precision-guided munitions, laser designators, and radars that followed low-altitude terrain, it was still the pilot's responsibility to execute the complicated task laid before him. Desert Storm was the reason Red Flag had been created in the first place; Air Force pilots had been trained for a major combat operation involving the integration of all aspects of air power to destroy an enemy's ability to wage combat operations. In the words of Air Combat Command Commander General Gilmary Hostage in 2012, "It was the major combat operation we always wanted." Now it was up to the young "fighter jocks," the tactical air crews,

[268] For the German operational air war of World War II see: James S. Corum, *The Luftwaffe: Creating the Operational Air War, 1918-1940*. Lawrence, Ks.: University Press of Kansas, 1997 and *Wolfram Von Richthofen: Master of the German Air War*. Lawrence, Ks.: University Press of Kansas, 2008; For Japanese operational air war see Thomas E. Griffth Jr*., MacArthur's Airman: General George C. Kenney and the War in the Southwest Pacific*. Lawrence, Kans.: University of Kansas Press, 1998; Finally, for Pete Quesada's tactical operations in Europe see Thomas A Hughes, *Over Lord: General Pete Quesada and the Triumph of Tactical Air Power in World War II*. New York: Free Press, 1995.

to see whether the investment of millions of dollars, thousands of hours, and lives lost in training exercises had been worth it.[269]

Shortly after midnight on 17 January 1991, the air campaign began. The first night of the war holds a special place for those who flew during it, and it has attained an almost mythical status. After all, night operations were one of the focal areas coming out of Vietnam, and the ability to "own the night" was a major advantage for the allied air forces. Still, "night one" operations lasted for only a few hours once the conflict began. Dawn approached rapidly, and, while this forced the F-117s back to the base, it did not stop the air war. Rather, air operations increased during the day, using F-15 air-to-air fighters, F-15E and F-16 air-to-ground attack aircraft, FB-11s, A-10s and Navy and coalition aircraft, in an unrelenting assault not broken by either daylight or periods of darkness.[270]

On the first night of combat, just after 12:22 a.m., the cockroach-like F-117s slipped out of the hardened aircraft shelters at King Khalid Air Base near Khamis Mushayt, Saudi Arabia, and took to the skies. Khamis Mushayt, in southwest Saudi Arabia, was a long way from the Iraqi border. As the aircraft closed on their ingress routes, they had to meet up with tankers flying out of other Saudi bases. After topping their tanks with an in-flight refueling, each F-117 pilot went through the process of "stealthing up" the aircraft. The process called for the pilot to run through a detailed checklist to ensure that the aircraft was as low observable as possible, including retracting any external antennae, turning off any emissions signals, and turning off the wing lights. There was an internal light in the cockpit that let the pilot know he had run the

[269] General Gilmary Hostage remarks to members of the 1st Fighter Wing in April of 2012, notes in author's collection
[270] Nighthawks Over Iraq," Operation Desert Storm online archive, George Washington University, 8-9.

checklist correctly. Still, it was not unusual for a pilot to run through the checklist multiple times as a precautionary measure.[271]

The first wave of ten Nighthawks were on their way to a combined integrated operations center and ground control center intercept site at Nukhayb, two air defense control headquarters, and the Iraqi Air Force headquarters in Baghdad, along with seven other sites. The routes had been carefully planned to ensure that the F-117s would not fly through the heaviest concentration of radar sites. However, the F-117s did not strike the first blow against Iraqi air defenses. That honor went not to a tactical jet but to rotary wing assets. Joint Task Force Normandy consisted of Army AH-64 Apaches and Air Force MH-53 Pave Lows. The Pave Lows guided the Apaches right up to an early warning radar site. The Apache attack punched the initial hole in the Iraqi defenses. High overhead and headed for western Iraq, the F-117s traveled unnoticed to Nukhayb. Now the pilots of the Thirty-Seventh Tactical Fighter Wing (Provisional) were about to kick down the door. Colonel Al Whitley, the Thirty-Seventh Tactical Fighter Wing commander, wasn't worried about the level of experience among his pilots. He knew they were well trained. In fact, they were a lot better trained than he had been on his first combat missions.[272]

At approximately 0130 very early in the morning of 17 January 1991, an hour prior to the Apache attack, Naval warships launched Tomahawk land attack missiles toward Baghdad. An hour later, the AH-64 Apache helicopters attacked the early warning radar sites in southern Iraq while the Tomahawk land attack missiles were still in flight. The F-117 stealth fighters entered this dead air space en route to attack targets in western Iraq and Baghdad. The helicopter, F-117,

[271] Colonel Elwood Hinman, interview with author, 20 Oct 2011; Lieutenant Colonel Steven Ankerstar, interview with author, 10 Nov 2011; "Nighthawks Over Iraq," Operation Desert Storm online archive, George Washington University, 8-9.
[272] "Nighthawks Over Iraq," Operation Desert Storm online archive, George Washington University, 8-9.

and cruise missiles began punching holes in Saddam's command and control network and destroying the radar sites necessary for the surface-to-air missiles to track targets, allowing non-stealth aircraft to enter Iraq's air space. The Iraqis now knew the Americans and their allies were coming. For months, American aircraft had flown standard patrols along the border of Saudi Arabia and Iraq; this routine activity led Iraqi radar operators to become complacent. The complacency now played into the hands of the allies.

The first wave of F-117s struck their targets at 0238 local time. On the East Coast of the United States, it was 7:30 p.m. when CNN reported that anti-aircraft artillery fire was being launched in and around Baghdad. Americans were glued to their televisions watching the grainy night-vision scene as explosions tore across Iraq's capital city and anti-aircraft batteries fired uselessly into the sky. However, there were no aircraft over Baghdad. The Iraqis fired blindly into the sky. It took about an hour for the indiscriminate firing to cease, ironically at nearly the exact moment the second wave of stealth aircraft flew into Baghdad. The first strikes had 13 direct hits out of 17 attempts. Two more waves of F-117s followed. As the sun rose at 0600 hours the next morning, the final wave of F-117s headed back to Saudi Arabia, as the low-observable aircraft stood no chance of survival during hours of daylight.[273]

Initial F-117 attacks destroyed ground-controlled interception and other radar sites. In a matter of moments, one of the main problems of the Vietnam era was overcome. Years of Red Flags had taught air planners to destroy these sites and force individual members of the enemy's military to react autonomously without higher headquarters direction. Saddam Hussein and his senior air commanders could not direct the war. The F-117 proved its worth that first night. However, superior technology provided only an opportunity. It took many, if not most, of the

[273] Thirty-Seventh Tactical Fighter Wing chronology; Diane Putney, *Airpower Advantage*, 342.

hundreds of American and coalition air crews attending Red Flags or other exercises to exploit that opportunity.

After the initial strikes by the first wave of F-117s, an armada from each American military service surged into Iraq and Kuwait. As Williamson Murray put it: "Here again peace time training paid huge dividends. A substantial portion of the air crews, particularly mission and package commanders had flown in Red Flag..." and these realistic training exercises "provided the Air Force with a solid base on which to plan and execute strikes involving multiple types of aircraft." The first night of air warfare in Iraq came in three distinct waves. The first wave struck targets between 0030 and 0130. The bulk of this force consisted of tactical fighters. FB-111s flew attack missions and were covered in the air by F-15s providing offensive counter air escorts. Navy A-6s, themselves Vietnam-era attack aircraft, from the Persian Gulf struck coastal targets, while F-14s and F-18s provided overhead watch. The attacks occurred simultaneously all across Iraq. In the North, West, South, and central sectors, it was as if Iraq was blanketed in coalition air power. B-52s entered southern Iraq to destroy five key airfields and then turned back across the border. By 0110, the second wave began striking their targets, avoiding the first wave returning to base in a carefully choreographed dance to limit the possibility of fratricide. At 0530, 194 aircraft intended to conduct strikes, suppression of enemy air defenses, and fighter activities encircled Kuwait, striking more than ninety different areas and twenty-four surface-to-air missile sites. As the final F-117s returned to their cave-like hiding places to avoid daylight, the air attacks did not abate. They continued throughout the next day. Wave after wave after wave of tactical fighters continued to hit targets.[274]

[274] Air Force Historical Research Agency, Black Hole Air Campaign graphics, NA-302. ; Williamson Murray, *Air War in the Persian Gulf*, 92

With the ground controlled interception sites destroyed, the Iraqi Air Force had no way of being vectored to the approaching storm of tactical aircraft. The strict reliance on the Soviet doctrine of the ground controllers directing the airborne aircrafts' movements worked against the Iraqis. Iraqi doctrine and tactics were defeated before the first Iraqi aircraft was airborne. There was no way for Iraqi pilots to coordinate an organized defense without the ability to communicate with their ground controllers. Dozens of Iraqi aircraft took to the skies anyway in a vain attempt to engage the Americans. It was not that they were not good pilots. On the contrary, many of them were combat veterans of the Iraq-Iran War. However, without the ground-controlled interception centers, they were effectively flying blind. All over Iraq, radar sites continued to go down. The pilots had no contact with ground controllers, and surface-to-air missile sites had no way of knowing when to turn on their radars to look for the coalition aircraft pouring into their country.

The American fighter pilots who flew into Iraq that night were a new breed. This is not meant as a hyperbolic endorsement of the mythos of the fighter pilot; rather, it is a statement of fact. The Desert Storm pilots differed greatly from those in every other era who had conducted air combat. For starters, the Desert Storm pilots were all college-educated. The Air Force had stopped commissioning non college graduates in 1965. While most Vietnam-era pilots had a degree, there were still some Korean and even World War II veterans piloting aircraft during the Vietnam conflict without a degree. Thus, the Desert Storm pilots were better educated than their predecessors, and, while there were a few Ivy League graduates sprinkled among them, the vast majority were either Reserve Officer Training Corps graduates or graduates of the Air Force Academy. Most of them had never seen combat, but they were flying the greatest fighter aircraft in the world and they were well trained. Years of attending Red Flags and numerous other

exercises had led them to this moment. They had faith in their training. Many of them had not only completed the "first ten combat missions" at Red Flag; they had done do so many times over. The missions executed on the first night of Desert Storm and beyond were actual combat, yet they closely mirrored exercise scenarios the pilots had accomplished many times before. They had faith in their superiors, and they had faith in each other. They also had faith that, should they be shot out of the sky and be lucky enough to eject, a crew of highly trained combat search and rescuers were preparing to come in and pick them up. However, not every pilot who took off that first night had experienced the crucible of Red Flag. Not every young officer had yet had the chance to log those first ten missions in a training environment. For example, First Lieutenant Kevin Robbins had only recently finished training to be a fighter lead before being assigned to the Twenty-Seventh Tactical Fighter Squadron of the First Tactical Fighter Wing and being deployed during Desert Shield. Years later, after attaining the rank of colonel and posting as commander of the First Fighter Wing, Robbins recalled, "I hadn't even finished Mission Qualification Training when we stepped out the door."[275]

In the early morning hours of 17 January 1991, Captain Steve Tate of the Seventy-First Tactical Fighter Squadron was leading a four-ship of F-15s supporting a strike mission of F-4Gs. At approximately 0314 local time, Captain Tate received a radar contact that was not "squawking" mode one or mode four identification; this indicated immediately that it was probably not a friendly aircraft. To make matters worse, the aircraft was bearing down on another allied aircraft at an alarming rate and maneuvering into weapons employment parameters. At twelve nautical miles away from the approaching aircraft, Captain Tate fired an AIM-7 sparrow missile with the accompanying brevity call of "Fox One!" The missile found its

[275] Colonel Kevin Robbins, email with author, 15 March 2012

intended target, and the Iraqi Air Force lost a Mirage F-1. All across the night sky, young captains and majors, born in the days of the Vietnam conflict, went to war in the air.

The Iraqi forces arrayed against the air armada didn't give up without a fight. Colonel Hal Hornburg, commander of the Fourth Provisional Tactical Fighter Wing, stated that he saw more flak on the first night of Desert Storm than he had encountered during his entire year in Vietnam. Surface-to-air missiles launched continuously the first night. Some of the missiles were guided by the indigenous radars, but many were fired without guidance and simply hoped for a lucky shot, a not uncommon occurrence in surface-to-air operations.[276]

Despite the heavy air-to-air and surface-to-air defenses, the first twenty-four hours of the war went better than planned. In the first day, the allied air forces shot down eight Iraqi aircraft including three MiG-29s. In return the allies lost six aircraft, but all were lost to the very potent surface-to-air missiles. The air planners initially believed loss rates would be quadruple the losses actually experienced, but Horner pointed out to all of them that it was only the first day of a very long campaign. Why were the Iraqis so unsuccessful at downing more allied aircraft? After all, as already indicated, Vietnam veterans flying on the first night of Desert Storm believed that the surface-to-air threat was denser than it had been in North Vietnam. Moreover, the Iraqis were certainly capable of downing the enemy based on both training and technological capacity. Nevertheless, the Iraqis faced failure on many fronts over the course of the war. The first was the massive amount of tactical aircraft versus larger bombers flying into Iraq. Obviously, the plethora of tactical assets flying at different altitudes were harder to track and target than large formations of high-altitude bombers. The tactical aircraft flying at all altitudes across Iraq no doubt wreaked havoc against missile systems designed to engage aircraft at a specific altitude. There was also a failure of Iraqi doctrine, which should also be extrapolated to

[276] James Kitfield, *Prodigal Soldiers*, 387.

a failure in Soviet-style doctrine. The separation of fielded forces from the command structure and ground control stations meant that the Iraqi air defenses fought the war autonomously without the direct orders that they were used to receiving. Finally, problems that the Iraqi defenders faced were the unrelenting attacks and sheer weight of the allied offensive. The allies had the ability to launch an aircraft package, recover it, and "turn it" immediately on another mission.[277]

There is a commonly held belief that there was no classic dogfighting during Desert Storm. There is also a long-held belief that American missiles more often than not found their intended target. Both are wrong. During Desert Storm, the Air Force, Navy, and Marine air assets fired forty-eight AIM-9Ms, the close-in missile of choice for air combat, but attained only a .23 probable kill rate, or eleven confirmed kills. This indicates that combat scenarios took place within the visual arena, even if very few turned into classic turning fights. Since the idea of dogfighting appeals not only to the American public but also to the American fighter pilot, any engagement that turned into classic aerial combat was likely to become legendary. It would be folly to state that each pilot who performed an air-to-air mission did not hope to become that very rare type of pilot -- one who could claim status as a "MiG Killer."[278]

On 19 January 1991, Captain Caesar "Rico" Rodriguez and his wingman, Captain Craig "Mole" Underhill, broke away from two members of their flight after being vectored from their defensive counter-air mission to enter Iraqi airspace to assist an egressing strike package. Crossing into western Iraq, the pair of F-15Cs picked up a pair of MiG-29s chasing down the strike package. As Rodriguez and his wingman closed in on the MiG-29s, the enemy aircraft turned away and attempted to draw the pair of F-15s deeper into Iraq. At the same time, a

[277] Diane Putney, *Airpower Advantage*, 345.
[278] First Fighter Wing History Office, First Tactical Fighter Wing history, 1991, vol. 1.,RAND report for Project Air Force, "Air Combat Past, Present, Future," August 2008.

second pair of enemy aircraft began closing in on the F-15s in a classic box-in maneuver. However, the second pair had yet to be identified as hostile by a local AWACS. Rodriguez separated from Underhill and dropped low to assist Underhill, as needed, and at the same time attempt to force the MiGs' radar to have to search for him in the ground clutter of the earth below. It was a classic move practiced at every Red Flag, and Rodriguez did it by instinct. As the aircraft closed in on one another, the airborne warning and control system finally declared a hostile contact, and Captain Underhill fired an AIM-7 that hit the MiG. No sooner had Underhill regrouped with Rodriguez than the second MiG closed in on the pair. However, this time the F-15's heads-up display indicated that the contact was friendly. Had the pair just inadvertently shot a friendly aircraft out of the sky and killed a comrade? Had they just committed the cardinal sin of fratricide?[279]

The aircraft continued to rapidly close with the F-15s and they again separated, this time with Underhill climbing high and away to gain a firing position on the enemy in case it proved to be necessary. Rodriguez and the MiG merged canopy to canopy, and any doubt as to the status of the aircraft was removed as the MiG-29 flew by and the two aircraft began a classic descending turning dogfight. If the age of the dogfight was over, no one had told this particular Iraqi. It was a quintessential textbook fight and one that American pilots had been warned not to get into with the MiG-29.

The MiG-29 was every bit as capable as the F-15 and, in some ways, significantly better in a one-on-one dogfight. The MiG-29 pilot whom Rodriguez was fighting had just seen his wingman blown out of the sky, and, no doubt, he knew he was in the fight for his life. The MiG pilot also knew that a secondary F-15 was high above him and maneuvering for a firing position.

[279] Mark Bowden, The Last Ace," The Atlantic, March 2009; Colonel Cesar Rodriguez, interview with author, 17 October 2011.

The MiG momentarily pulled up and then down again. This momentary lapse of judgment allowed Rodriguez to continue his turn unabated and put his F-15 in the proper position to use his missiles against the MiG. Rodriguez skillfully went from a defensive position to an offensive one. The MiG pilot knew the battle was lost and attempted to escape. The Iraqi pilot rolled the aircraft over and pulled the stick hard towards him and performed a "Split S." However, his attention continued to be entirely on the two F-15s, and he did not realize the fight had moved so close to the ground. With only a few hundred feet of air between the MiG-29 and the ground, the pilot pulled his aircraft straight into the ground. Rodriguez later stated, "He had lost his situational awareness. He was trying to perform a maneuver that he can do comfortably at 5,000 or 10,000 feet, and [didn't] realize the fight had degraded and degraded closer to the desert floor. It's a lack of training." The lack of training cost the pilot his life. The Iraqi Air Force had no Red Flag, no large-scale composite exercise to train its pilots.[280]

Years later, Rodriguez stated that this particular dogfight on 19 January 1991 proved several things. First, Red Flag worked. Rodriguez stated that the engagement was one "that I had flown 100 times before against a variety of western fighters..." and that "hours of intelligence training provided key nuggets of information that, when applied to a real tactical situation, resulted in an offensive attitude while still being pressured defensively by the enemy." Second, it was not always possible to engage an enemy beyond visual range, and so it was necessary to practice close-in fighting at Red Flag and to continue training at home stations. Realistic training scenarios, even at high speeds and extremely low altitudes, were necessary and not than just to check off some boxes on a training schedule; they were scenarios that did present themselves in actual combat settings.[281]

[280] Colonel Cesar Rodriguez, interview with author17 Oct 2011.
[281] Colonel Cesar Rodriguez, interview with author17 Oct 2011.

American success during Desert Storm was not total. No amount of training will ever prevent combat losses. Even the most realistic of scenarios cannot come close to the sickening feeling of seeing a surface-to-air missile rocketing into the night sky. Despite the technological and training prowess held by the allied air forces, Saddam Hussein's air defense system was still a potent threat, as twenty-three allied aircraft and their air crews learned throughout the conflict. On the first night of the campaign, four allied aircraft were shot down, with three more losses the next day, and three more losses the day after that. Almost all of these losses were due to anti-aircraft artillery fire and SA-2 and SA-3 missiles. The Air Force alone lost four A-10s, three F-16s, two F-15Es, and one F-4. However, these figures were minimal compared to the 25% losses expected on the first night of the war.

The Iraqi Air Force essentially quit fighting after day three but this did ease the threat faced by the allies. The Iraqis had already lost more than a dozen aircraft when the allied force launched a massive strike against the Osirak Nuclear Facility on the outskirts of Baghdad. The air tasking order for the day labeled this particular mission "Package Q." The strike package consisted of more than fifty F-16s as well as escorting fighter coverage, suppression of enemy air defenses aircraft, and electronic jamming aircraft. The Osirak Nuclear Facility was known to be one of the most heavily defended areas in Iraq, and many problems beset the attacking aircraft, including loss of their suppression of enemy air defenses coverage as the attack commenced. Two F-16s were lost during the attack, falling victim to surface-to-air missiles. Many more of the attacking aircraft sustained damage. The attack proved that the air defenses around Baghdad were dangerous for non-low-observable aircraft. However, the rub was that, while the F-117s were capable of safely attacking the facility, each F-117 carried only two weapons. Therefore, it took the F-117s eight different strike missions—the last one occurring on day thirty-eight of the

war—before the target was declared destroyed. Although the target was declared damaged after the initial strikes by F-16s and F-117s, the air planners still felt the need to task forty-eight more F-117s with additional attacks against the nuclear plant on different nights. For example, on day nineteen of the conflict alone, the Air Force sent seventeen F-117s on attack missions against the facility. [282]

After the war, General Buster Glosson briefed Congress that the initial conventional strike made by large numbers of non-low-observable aircraft using non-precision-guided munitions was unsuccessful, and that the failed attack was followed up by a successful attack which employed low-observable aircraft and precision-guided munitions. Glosson's testimony was misleading. The strike by the F-16s heavily damaged the nuclear facility. However, Air Force planners wanted to ensure the facility's destruction and chose to send F-117s against it. Due to the small number of weapons each F-117 carried, it took strikes on several nights for air planners to ensure that amount of target destruction that they required had been achieved.[283]

The "strategic air campaign," a term mentioned again and again both during and after the war, continued unabated for forty-three days. By the time Phase III began, the Iraqi Army in Kuwait was completely separated from any higher headquarters. The allied forces' tactical air power had severed all lines of communications, the life blood of an army in the field. Strategic targets throughout Iraq continued to be destroyed, entirely by tactical-level aircraft. This did not hinder General Horner's staff from turning their attention to the fielded forces inside Kuwait, a drastic departure from Colonel Warden's original plan. Still, after the war some air power zealots continued to believe that the war could have been won in the absence of ground power.

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[282] GAO Report, GAO/NSAID-97-134, retrieved from www.au.af.mil/au/awc/awcgate/gao/nsaid97134app_11.htm, retrieved on 23 December 2011.
[283] GAO Report, GAO/NSAID-97-134, retrieved from www.au.af.mil/au/awc/awcgate/gao/nsaid97134app_11.htm, retrieved on 23 December 11.

Their boastings were backed up during debriefs with captured Iraqi officers. An Iraqi general said after the war that, "had the air campaign continued two or three weeks longer, the Iraqi Army would have been forced to withdraw due to logistical strangulation."[284]

The retreat from Kuwait, precipitated by the ground invasion and not the ongoing air campaign, was chaotic. Somewhere in the neighborhood of 2,000 to 3,000 vehicles—a combination of tanks, half-tracks, stolen cars, and buses—attempted to escape back to Iraq along Highways 8 and 80, which led out of Kuwait City and into the southern town of Basra. The now infamous "Highway of Death" resulted in the destruction of most of these vehicles. The retreating Army was set upon by Marine, Navy, and Air Force assets that bombed both ends of the columns, effectively boxing in the remaining Iraqi assets and men. This approach may have resulted in the relatively low casualty rates. Once the Iraqis realized they were trapped, many, if not most, abandoned their vehicles in an attempt not to escape but simply to survive. Of the 10,000 Iraqis who began the retreat, most estimates put deaths at below 500.[285]

So pervasive was tactical air power during Desert Storm that the Iraqi military became convinced that American and coalition pilots were omnipotent. Iraqi generals believed that the American military, especially the air forces, "could see everything…hear everything…and hit anything." When captured, officers were asked whether they had attempted to intercept

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[284] "The Gulf War: An Iraqi General's Perspective," Air Force Historical Research Agency, GWAPS, NA-22.

[285] Perry D. Jamison, *Lucrative Targets: The U.S. Air Force in the Kuwaiti Theater of Operations*, Washington D.C.: Air Force History and Museums Programs, 2001, 153-154; Robert J. Schneller, "On the Storm's Outer Edge: U.S. Navy Operations in the Persian Gulf War," *The Eagle and the Desert: Looking Back on U.S. Involvement in the Persian Gulf War*, eds. William Head and Earl H. Tilford Jr., (Westport, Conn.: Praeger Press, 1996), 241-242; George Washington University Desert Storm Archive, Final Report to Congress, Conduct of the Persian Gulf War, 332, http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB39/#docs

American transmissions. The interrogators were rebuked with a "lecture on the dangers of turning on any emitters or receivers for any length of time."[286]

Over the course of the war, more than 100 of the Iraqi Air Force's aircraft escaped to Iran. This was not the first time Saddam had evacuated aircraft to neighboring countries. During the Iran-Iraq War, Saddam had moved sizable portions of his air force to nearby Arab states for protection. Why he thought that the same protection would be afforded to his air force in a country he had just spent eight years fighting continues to baffle military theorists and historians today. Saddam probably bet that a fellow Islamic country, even a predominantly Shia one, was more likely to provide safe harbor to his aircraft than leaving them to face the allied air armada. On that count, Saddam was wrong. Iran never returned the aircraft, at least not to Iraq. Some aircraft were returned to Kuwait, including those that the Iraqi Air Force had stolen in August 1990. It is purely conjecture to wonder what would have become of the rest of the Iraqi Air Force had they faced the allies, but even if Saddam had sortied every combat aircraft he had, the best result he could have expected was the destruction of a handful of allied aircraft at the expense of his entire air force.

SAC's Supporting Role

Red Flag exercises demonstrated that B-52s could not fly into a high surface-to-air missile threat area. Planners for the air campaign took those lessons into consideration when determining what role SAC bombers would play in the conflict. The B-52 was the only Strategic Air Command bomber used during Desert Storm. Strategic Air Command had suffered tremendously in the post-Vietnam era. The B-1 underwent so many delays, cancellations, and re-programmings that it was still not ready to conduct tactical missions in 1991; at that point, it

[286] "The Gulf War: An Iraqi General's Perspective," Air Force Historical Research Agency, GWAPS, NA-22, 5-6.

provided only a method to deliver nuclear munitions. The bombers designed to replace the B-52 in the 1960s, the B-70 and B-1 had both faced cancellation with Reagan reviving the B-1. The Air Force's newest bomber, the B-2 *Spirit*, did not see service until the late 1990s. In 1991, when Desert Storm began, the B-2 stealth bomber was still six years away from operational readiness. Strategic Air Command had spent four decades procuring and building bombers against the perceived threat of a war against the Soviet Union. Nuclear delivery was their *raison d'être*. Strategic Air Command's paradigm was wrong. As historian Donald Mrozek once opined:

> Although organizations might build weapons, how could one guarantee these weapons would be used coherently and purposefully? The focus on things—to the extent that it becomes a matter of creating a product and developing inventories in the form of force structure—can become an obsession with management, at the expense of leadership and the operational art.[287]

Strategic Air Command's force structure in 1991 was ill-equipped to provide significant contributions during training exercises and was even less suited to a conventional war. The organization still relied on a Douhetian model of warfare. But as historian Phillip Meilinger pointed out, "If the only circumstance that makes Douhet relevant is a nuclear holocaust, then he is totally irrelevant."[288]

Strategic Air Command's force structure was irrelevant to the planning and execution of Desert Storm. The relatively modest use of bomber assets during the war should come as no surprise given Strategic Air Command's focus in the previous four decades. The B-52 could

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[287] Mrozek, Donald J. "In Search of the Unicorn: Military Innovation and the American Temperament." *Air University Review,* XXXVII, no.6 (1986): 28-45. http://www.airpower.au.af.mil/airchronicles/aureview/1986/sep-oct/mrozek.html

[288] Phillip S. Meilinger, ed., *The Paths of Heaven: The Evolution of Airpower Theory* (Maxwell Air Force Base, Ala.: Air University Press, 1997), 31.

only be used in areas where there was no significant level surface-to-air missile threat. Despite conflicts proving time and again that the days of the heavy bomber had ended, Strategic Air Command continued the myopic focus on generalized nuclear war. Korea and Vietnam both saw heavier use of tactical assets, and the latter conflict clearly demonstrated that the bomber did not always get through, even though the Second World War had already proven the inaccuracy of that particular mantra on multiple occasions. The bomber mafia remained quite resilient at finding proof of the effectiveness of the strategic-level assets. The fact that there was no nuclear war was "proof" that the bombers were doing their job. Bomber advocates erroneously used the Operation Linebacker campaigns of Vietnam as proof of the heavy bomber's continued efficacy. However, later historians, most notably Mark Clodfelter in *The Limits Of Air Power*, disputed this claim. In 1991, Strategic Air Command had the wrong equipment, the wrong mentality, and the wrong grasp on the history of aerial warfare to adequately provide useful contributions to the war. Thus, during Desert Storm, Strategic Air Command was relegated to being a supporting member of the air campaign.

After the war, the General Accounting Office (GAO) issued a report to members of Congress, most notably Chairman of the Senate Armed Services Committee Senator Sam Nunn, on the utility of the B-52 during Desert Storm. The obvious point of this particular report was clear in its title: "Operation Desert Storm: Limits on the Role and Performance of the B-52 Bombers in Conventional Conflicts." The report was clear from the very beginning when it stated that due to the diminished threat of a general nuclear war between the Soviet Union and the United States, the only clear use for bombers was in a conventional manner. Since Desert Storm saw the first use of bombers since Vietnam, members of Congress were rightly concerned not only about the current bomber force but also about just how the Air Force planned to use

bombers in the future. Of the 1,000-plus combat aircraft used during Desert Storm, the B-52s formed only 75 of that number. By way of comparison, there were half as many F-117s, but these aircraft hit the "strategic targets" of the war and flew more total missions.

As the GAO report indicated:

> The nuclear orientation of the B-52 force found it inadequately prepared for the demands of Desert Storm conventional missions. The nuclear role emphasized long-range, centrally planned strikes against fixed targets, in which lone bombers attacked from low altitudes with little communication. During Desert Storm, B-52s attacked from high altitudes, required tactical fighter support, and carried out strikes in closely coordinated groups of aircraft.[289]

Perhaps the most damning statement in the report was that the B-52's contribution to the overall war effort was minimal and did not "stand out" over the far more numerous tactical fighters. The GAO indicated that the only way for bombers to distinguish themselves would be in missions "tailored to its strengths." However, if the only mission the B-52 was uniquely tailored for was delivering nuclear weapons, then it becomes hopelessly useless in modern combat; this perspective is backed up by the fact that the B-52s flew on only 3% of the air combat missions in Desert Storm.[290]

The GAO report also faulted Strategic Air Command's tactics and training methods and its inability to conform to new standards of warfare outside the nuclear realm. "Many of the assumptions implicit in the profile of a nuclear mission are immaterial in a conventional setting," the report said. Strategic Air Command crews did not know how to interact with other aircraft in

[289] "Operation Desert Storm: Limits on the Role and Performance of the B-52 Bombers in Conventional Conflicts (unclassified Summary)," GAO, May 1993, 3.
[290] Ibid, 4-5

larger packages since each bomber traditionally trained as a package of one. Their limited exposure to Red Flag no doubt hurt their ability to contribute in a meaningful manner. In 1990, the Air Force, especially the bomber community, struggled to integrate a weapon system specifically designed for nuclear missions into a conventionally fought war where the risk to the safety of the bomber crews outweighed the aircraft's contributions to the campaign.[291]

Air Force leaders quickly recognized the contributions of tactical air power over those of strategic air power. As one Air Force history stated after the war, "Not only were tactical and strategic roles overlapping with growing frequency, but only one command—[Tactical Air Command]—appeared to be organized, staffed, and equipped to handle conventional operations, especially short-notice deployments." The underlying theme was abundantly clear; in the absence of the conventional nuclear war threat and with regional conflicts demanding quick response and flexible roles, tactical air power was suddenly the only game in town.[292]

Admittedly, the venerable "Big Ugly Fat Fucker (BUFF)" crews, as they were referred to in Air Force circles, performed their missions with aplomb and accuracy. However, there was nothing strategic about the B-52's use during the conflict. Instead, the B-52s supported the tactical campaign by attacking massed formations of troops, destroying lightly defended airfields, and launching air-launched cruise missiles from a considerable stand-off distance. Planning documents from the Black Hole staff indicate that a massive B-52 strike was deleted during planning for fear of vulnerability to surface-to-air missile sites. In its place went FB-111s, F-15s, and F-16s. The fighters stood a better chance of survival than the very large bombers, which were the backbone of Strategic Air Command but could not be used to strike many targets in Iraq and Kuwait. The strategic targets were all struck by tactical-level fighters,

[291] Ibid, 5
[292] ACC, ACC Files, "Establishment of Air Combat Command," Air Combat Command, 1992.

and the B-52s performed tactical-level interdiction tasks. During Desert Storm, the line between tactical and strategic disappeared entirely. In 1991, the Air Force finally got the message. The bomber will not always get through. This was the beginning of the end of Strategic Air Command.[293]

Perhaps the most damning indictment against the B-52's role in Desert Storm came from the joint force air component commander himself. Speaking to Congress after the war, Horner indicated that only stealth aircraft could survive in a modern integrated air defense system environment. Horner stated that only F-117s and B-2s could deliver the "knockout punch immediately." He went on to state that there were those who still believed that the B-52s could provide strategic air power but that this view "…is mistaken. It simply couldn't survive a heavy threat environment." Some might argue that the B-2 was by virtue of being a bomber a strategic asset. The justification for the program was that its stealth capabilities, like the F-117, could be used to bypass air defense systems. However, in actuality there is nothing strategic about the B-2. It performs a tactical mission just as the F-117 did in Desert Storm. Its later use in Allied Force proved that it was nothing more than a large and low-observable tactical asset to be used just as any other weapon. Even if one allows the argument that the B-2 is a "strategic" bomber, the argument is quickly overcome by historical events. By the time the B-2 entered service, there was no Strategic Air Command in existence any more.[294]

In total, the Air Force flew 69,406 of the 118,661 sorties flown during Desert Storm. Of those sorties, 27, 811 were flown by fighter-designated aircraft, including the F-117, while only 1,741 were flown by a bomber, the B-52 being the only bomber used by the Air Force during Desert Storm. Strategic Air Command bombers flew only a small percentage of the overall

[293] Black Hole Air Campaign planning graphs, Air Force Historical Research Agency, NA-302.
[294] General Charles A. Horner, Presentation to the Committee of Appropriations, Subcommittee on Defense, 1991.

sorties and accounted for a miniscule percentage of all combat sorties. The F-117s dropped 1,769 precision-guided munitions and flew 1,741 sorties, accounting for roughly 20% of the precision-guided munitions dropped during the war. However, these aircraft constituted only roughly 16 percent of the overall sorties. Even though the F-117 and B-52 flew a similar number of sorties, it would be hard to argue that the B-52's contribution equaled that of the stealth platform. In addition, about 26,000 combat sorties were flown by other tactical aircraft-- the F-4, F-15, F-15E, F-16, and FB-111. Moreover, these high sortie numbers do not include the more than 8,000 sorties flown by the A-10 in conducting close air support missions. In short, Desert Storm was a theater-wide tactical air war. The terms tactical and strategic were essentially meaningless and no longer truly applied to the type of air warfare conducted in Iraq. The commonly used terms could no longer be delineated; no one aircraft fit neatly as either necessarily strategic or tactical. [295]

While the first several weeks of the war certainly had strategic-level effects, it was not a strategic air campaign in the sense that Air Force leaders had traditionally understood the term. World War II, Korea, and Vietnam all used "strategic" as a synonym for a bombing campaign. However, what occurred in Iraq was not a strategic bombing campaign. It was a tactical air campaign conducted across the operational theater that produced strategic- and operational-level effects, allowing Commander in Chief of the Central Command Schwarzkopf freedom to conduct the land portion of his campaign with freedom of maneuver and, by and large, against an enemy incapable of receiving orders from its own national command authorities. It was not, in theory or in execution, a strategic air campaign. General Billy Mitchell, Alexander De Seversky, Hap Arnold, Ira Eaker, and Curtis LeMay would not have recognized Desert Storm as a strategic air campaign, as the very assets used went against their understanding and preconceived notions

[295] Gulf War Air Power Survey, vol. 5, 231.

of what an air campaign was. CENTAF planners decided early in the planning process that the bomber would not get through. Therefore, Desert Storm was a drastic departure from previous air wars. While the outcome would have pleased the air power pioneers, they would have struggled to understand how tactical air assets could accomplish so much and the bombers so little. In short, the terms strategic no longer made sense to apply to aircraft any more than the terms could apply to ground troops.

The land campaign was itself proof that the Army had learned from the mistakes of Vietnam, demonstrating the changes implemented within the Army in the aftermath of that conflict. The Iraqi ground forces by and large did not put up a fight, but the battles of 73 Easting, 67 Easting, and Medina Ridge proved that Iraqi armor units were willing to make a stand against American troops despite the lopsided results in favor of the Americans. Much as in explaining success in the air war, the ease with which the Iraqi ground troops were defeated led many to see American technological prowess as the reason for victory and not in the years of training, some done in conjunction with the Air force at Red Flag, that enabled victory. This sentiment was typically combined with derisive statements about Iraq's lack of preparedness on the battlefield, comments that had been conspicuously absent prior to the beginning of hostilities.

There are other reasons for Iraq's swift defeat in 1991. One was Saddam's own doing. As American and coalition forces built up their military strength, Saddam ratcheted up his rhetoric. A captured Iraqi general told the Americans who debriefed him after his capture that "Saddam boasted [that] America would not tolerate thousands of dead GIs, but that Iraq was ready for such sacrifice, Iraqi soldiers in the [Kuwait theater of operations] were quick to grasp

that he was talking about them, and morale dropped further." Iraqi soldiers may have been battle hardened, but they were also war weary after fighting Iran for the better part of a decade.[296]

There are other indicators of why Iraq suffered so heavily during the operational phase of Desert Storm that have only come to light in recent years. The 2003 invasion, occupation, and restructuring of Iraq opened the internal archives of Iraq for the first time. An American military study conducted by the Joint Advanced Warfighting Program and the Institute for Defense Analysis recently produced a series of studies based on the Iraqi Archives. The study details the twenty years of conflict between the U.S. and Iraq from an Iraqi perspective. The extensive project demonstrated what Saddam believed had gone right and wrong during Desert Storm.[297]

The Iraqi Air Force had spent much of the 1980s in conflict against Iran and the last half of the decade attempting to rebuild its capability and instill confidence in senior leaders, most notably Hussein himself, who was disappointed by the early failures against Iran. By the latter part of the Iran-Iraq War, however, the Iraqi Air Force adequately performed deep-strike missions and performed well as it combined arms with the Iraqi Army. By the end of the Iran-Iraq War, the Iraqi Air Force was a formidable regional power and a source of pride for Saddam. For all these reasons, American military planners had good reason to fear the Iraqi Air Force. Yet the one thing they didn't know may have allowed them to breathe easier in the planning stages of the conflict. Saddam never had any intention of using his air force to its fullest potential. In fact, his military aim in 1991 was best translated as winning by not losing. As the Iraqi Perspective Study found, "Iraq's inability to overcome the Coalition's air power capability was, ironically, a key component in Saddam's definition of victory." Hussein only planned to preserve as much of his air arm as possible to use in the future; his plan was to survive to fight

[296] "An Iraqi General Officer's Perspective," Air Force Historical Research Agency, NA-22, 5.
[297] "Um Al-Ma'arik (The Mother of all Battles): Operational and Strategic Insights from an Iraqi Perspective," Institute for Defense Analysis, 2008.

another day. Saddam's definition of victory was not the tangible defeat of allied assets, but rather just how much of his own force was not destroyed.[298]

Saddam's grip on reality seemed to be tenuous, as he was unaware of, or unwilling to accept, the full weight of what coalition air planners planned to bring against him. As General Horner later stated, Saddam "had no idea what air power is. We flew in one day as many sorties as [Saddam] faced in eight years of war with Iran. He had no air experience." The Iraqi Air Force expected the coalition to fly sortie counts in the thousands. In actuality, the coalition flew more than 100,000 total sorties. The Iraqi Air Force had no intention of going head-to-head with its full weight against the allied air power, but even had this been the plan all along, Saddam's air force could not have competed with an air armada that could fly day and night, around the clock, for a sustained period of time.[299]

In the end, it was not technology that beat Saddam Hussein's forces. A large portion of the allied air force was composed of Vietnam-era aircraft, including F-4s and F-111s. It was not the stealth fighters that provided a determining technological advantage. As John Warden stated years later, "We would have won the air war without the F-117. It would have taken longer and it would have cost more aircraft and probably the lives of more pilots, but we could have done it." It was not the massed air armada or beyond-visual-range missiles or precision-guided munitions that ensured military success. Yes, all of these contributed to the victory in 1991. But the deciding factor was that U.S. airmen were simply better trained and better prepared to meet the threat that lay before them.[300]

As intangible as the advantage of superior training might appear and as hard as it might be to quantify, the American pilots were better prepared for combat than any other aviators in the

[298] Iraqi Perspectives Project, Phase II, 350.
[299] Iraqi Perspectives Project, Phase II, 98, 198, 355.
[300] John A. Warden, interview with author, 10 March, 2011.

history of manned flight. A few years after Desert Storm, the American pilot Cesar Rodriguez who shot down two MiG-29s in Desert Storm and another over the skies of the Balkans, stated that the single most important contribution to allied success in Desert Storm was "training and attitude…then we have the best technology. After that we are afforded the chance to train with the technology and this, training and technology together, complements the aircraft's capabilities." This combination of realistic training and advanced weapons made a formidable team, one that Rodriguez believed would defeat any other nation in air-to-air combat. He said, "If you replaced the Iraqis with any other air force…the end result would be the same."[301]

General Merrill McPeak, Air Force Chief of Staff during the Gulf War, summed it up best after his retirement:

> You just can't overstate the value of the human side of the Air Force, the people in it, and what they can do. We were better organized than Saddam Hussein; that's all there is to it, just better organized. We had better people and a better organization. We had been to Red Flag. We knew what the hell we were doing. Our tactics were good. Our doctrine for air employment was good. So Saddam Hussein ran into a buzz saw. He ran into the United States Air Force ready to fight from top to bottom. Basically, the lesson is this: our people beat his people.[302]

General Bill Creech also pointed to training as a primary reason for the Air Force's success in Desert Storm, but he also demonstrated how other air forces were not ready for the same style of combat:

> Did it all work? The Gulf War says that it did. By way of a contrasting example, the British [Royal Air Force] had clung to the "go low" thinking. They came to the Gulf War

[301] Colonel Cesar Rodriguez, interview with author 17 Oct 2011.
[302] General Merrill A. McPeak, Oral History Interview, Air Force Historical Research Agency, 19 December 1994, K239.0512-2138 C. 1, 103.

> with seventy Tornadoes and quickly lost seven. They then got up out of the weeds to mirror the [U.S. Air Force's] tactics but then found that they didn't have the munitions to fit that approach. It was the same for the French Air Force, which learned the futility of going low by getting two separate flights badly shot up early in the war. Even the Navy showed that it had been asleep at the switch on this issue. The Air Force in forty-three days of intense day-and-night combat lost a grand total of only thirteen fighters. That was by far the lowest loss rate of any of the coalition air forces. It was even far lower than our peacetime accident losses in the early 1970s and before. Had the Air Force had the same loss rate as the [Royal Air Force], we would have lost some 160 fighters, not 13.[303]

An Air Force FB-111 pilot stated of the tactical application of training in real-world combat environment that "Training saved our lives! We trained for the low and medium altitude war. Eighty percent of our training was for the low war altitude environment, but we found training for the low war made fighting a high war a little bit easier….Our training allowed us to verify the operability of our systems, prior to the war….and of course, we fought like we trained."[304]

Too much focus was placed on the machines after Desert Storm; technology had won the war. This statement overlooked the primary importance that developments in training had played in the Air Force's conduct of war between 1975 and 1991. It was all but ignored after the Gulf War, even by some Air Force leaders.

Mark Clodfelter said in his fine work *The Limits of Air Power* that "the supreme test of bombing's efficacy is its contributions to a nation's war aims." In Desert Storm, the Air Force provided the preponderance of air assets, and these assets aligned with and perfectly executed the nation's war aims. Fighter-bombers provided the overwhelming majority of the air-to-ground

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[303] General Wilbur Creech, Oral History Interview, Air Force Historical Research Agency, K239.0512-2050 C. I, 228.
[304] F-111 pilot quoted in Williamson Murray, *Air War in the Persian Gulf*, 79

munitions. The fighter-bombers were technologically sophisticated even if they were older aircraft in the case of the FB-111. Again, the technology had less to do with the overall success of the war effort than did the decade-long emphasis on the proper training to use the technology. Although precision-guided munitions caught the attention of the American public, the weapons mattered less than the ability to perform precision delivery from all air-to-ground assets. Americans viewed the aerial superiority through the lens of technology. The hardware, the aircraft, and the weapons themselves could be seen and were tangible demonstrators of what went right during the war. Weapons system videos of exploding buildings, which were visually pleasing, were another concrete example. Less easy to see and requiring more mental dexterity to understand was the training process that allowed pilots to use the weapons and technology to produce results.

The air campaign was successfully accomplished due to two primary reasons. The first was the training revolution, led by Tactical Air Command, which began after Vietnam and saw the birth of Red Flag and other large-force exercises. The second was the Strategic Air Command's myopic focus on general nuclear war and its inability to conform to the possibility of large-scale conventional conflict. Its stringent adherence to what it believed was the dominant paradigm and its inability to learn lessons similar to those taken by the Tactical Air Command ensured that the once mighty command would play a greatly reduced role during the conflict.

After the Gulf War, the Air Force underwent a metamorphosis. Now that tactical air and strategic air power had become indivisible, the need for two separate commands became superfluous. The combination of Strategic Air Command and Tactical Air Command into Air Combat Command was a long overdue measure that could only be accomplished in the aftermath of Desert Storm (Air Force doctrinal purists would say that it was the "inactivation" of two

commands and "creation" of an entirely separate entity). Without the looming threat of an imminent Soviet invasion of Western Europe and with the two commands being coequal, there was no reason for all Air Force combat assets *not* to fall under a single major command. Creating Air Combat Command was the single most sensible organizational move in the Air Force's brief history.

Nonetheless, even the combination of the two major commands into one did not stop Air Force leaders and public figures from drawing the certain conclusions from the conflict. The environment after Desert Storm was ripe for the Air Force to make major gains in funding vis-à-vis the other military services just as the service was also ready to begin the procurement battle for the next-generation fighter. The choice was similar to the one faced in the mid-1970s. Should the USAF go with updated fourth-generation fighters (updated versions of the F-15 and F-16), or should they go with the technological advancement of the next-generation air-to-air fighter? Again, the Air Force decided to go for another technologically advanced airframe. Rather than brief Congress on the utility of advanced training scenarios and expansion of the Red Flag mission, senior leaders sat before Congress and repeated one word time and again: stealth. They saw that concept as the one thing that had won the war, and they viewed the procurement of advanced stealth platforms, the F-22 and B-2, as the future of air warfare. Still the U.S. Air Force was able to, once again, have its cake and eat it too. As technologies continued to change and new advanced fighters were designed and purchased, the one foundation that remained to prepare pilots for operations in the 1990s was Red Flag. Operations that followed Desert Storm continued to prove the utility of Red Flag and also the danger of overreliance on the stealth technology.

CHAPTER 8 - After the Storm

In the aftermath of Operation Desert Storm, a new era of air power dominance was heralded and ushered in what technology historian Thomas P. Hughes called the "technological sublime." Military members, especially those within the Air Force, and members of the general public took pleasure in the sights and sounds of demonstrated air superiority over a much weaker and supposedly technologically inferior nation. The technological sublime led in turn to an enthusiasm for technology in which proponents of the air war cited it as a new way of warfare. For many in the Air Force, it was the ultimate vindication of World War II strategic bombing planners and Air Force pioneer Billy Mitchell. The success of tactical aircraft on the battlefield also meant success for the fighter community in the Air Force's hierarchy and prevailing culture. Rather than one MAJCOM that dominated throughout the Air Force, members of both SAC and TAC could be found at all levels of command. But if the terms strategic and tactical no longer had concrete meaning then why have separate commands at all? Why not one air command for combat? The creation of Air Combat Command was a corporate merger between the two commands even though some, including John Warden, viewed it as a hostile takeover by the fighter generals, the same general officers who wrested control of TAC after Vietnam and made the meaningful changes in training that allowed for success during Desert Storm.

Just how revolutionary was this air dominance over the skies of Iraq? Asked another way, was the Air Force right to be justified in its perception of dominance over Iraq? The answer is an unequivocal yes. Was it a revolution in military affairs? Yes. The 1991 war in the Persian Gulf certainly demonstrated a new way to fight wars, especially where the Air Force and tactical aircraft were involved. However, as conflict goes it is clear that Desert Storm was also the culmination of an evolutionary process by which a revolution in how air power was used in

war was affected. Following Vietnam, the Air Force changed the way it trained its pilots. Beginning with the first Red Flag in the fall of 1975, the Air Force opened a training facility that over the course of the next fifteen years changed the way pilots conceived of and executed air war. It was a fifteen year long revolution. It was a slow and ever-evolving process that built upon each previous exercise. The tactical exercises created after the end of American involvement in Vietnam--Red Flag in particular but also Green Flag, Blue Flag, and others--created a unique American style of aerial warfare but one that was overlooked in the immediate aftermath of the conflict in the Persian Gulf.

The revolution in training in the decade before Desert Storm was just as important as the new aircraft over the skies of Iraq -- perhaps more so. As previously indicated, the Air Force, other American military elements, and allied countries did not engage in an air campaign with only modern weapons. In fact, the work horses of the conflict were Vietnam-era aircraft, including the F-111 and the F-4. Certainly, the U.S. had certain asymmetric advantages, and stealth was at the forefront of this advantage and one that Iraq could not counter, but these technological marvels should not overshadow the importance and impact that training had on the outcome of the war. The Air Force did not use this unique opportunity to herald its advancements in training or showcase Red Flag to the American people. Instead, the Air Force used the months after Desert Storm for one purpose: To convince the American people and the U.S. Congress that a force structure based on stealth was the only way to survive conflicts in the future.

The Air Force Bets on Black

For every article critical of the F-117's use in Panama, there was easily twice that number of articles praising its use during Desert Storm. On television and in the public mind, stealth was the face of the air war. Despite the relatively low number of sorties actually flown by the aircraft, the F-117 became the visual image most associated with the air campaign. The Air Force did not hinder this perception. In fact, in testimony before the Committee on Appropriations and Subcommittee on Defense, Lieutenant General Horner was effusive in his praise of stealth technology:

> Stealth has revolutionized warfare. The F-117 allowed us to do things that we could have only dreamed about in past conflicts. Stealth enabled us to gain surprise each and every night of the war. For example, on the first day of the air campaign the F-117s delivered the first bombs of the war against a wide array of targets, paralyzing the Iraqi air defense network.[305]

Horner's testimony was misleading. Certainly, the F-117 contributed enormously to the outcome of Desert Storm, but it was not the wonder weapon that General Chuck Horner and others made it out to be. The perception passed to members of Congress was one aircraft, one target, one bomb. Nothing could have been further from the truth. Very few targets required only one weapon to destroy or even degrade them. In fact, it took dozens of strikes to ensure the destruction of most targets. This was a fact that Air Force leaders glossed over in their testimony. The best example was the presentation to Congress about the follow-up F-117 strikes against the Osirak Nuclear Facility, which was described in the previous chapter. It was simply untrue that a massive strike package of F-16s failed to achieve the required damage against the

[305] General Charles A. Horner, Presentation to the Committee of Appropriations, Subcommittee on Defense, 1991.

facility and that this was subsequently overcome by a single F-117 strike. In fact, the F-117s were forced to hit the same target again and again due to the low level of ordnance carried by the stealth platforms. On average, it took forty-four tons of munitions to destroy each target. This amount ranged anywhere from the rare single bomb to as many as 155 tons needed to destroy some targets through more than a dozen strikes, as was the case with the nuclear facility.[306]

As he went on, Horner gave less and less testimony about the F-117 and more about the forthcoming B-2. Despite the role played by non low observable assets the Air Force focused on stealth. It was less about the perceived strategic nature of the B-2 than it was about the fact the aircraft was stealthy; the difference this time was that, if the bomber was low observable, then it would certainly get through. The Air Force treated the procurement of its desired force structure after Desert Storm like a roulette table in Las Vegas, and the Air Force bet it all on black. Later reports to Congress presented an entirely different story with regard to the effectiveness of the F-117. The Government Accounting Office boldly said that "many of the [Department of Defense's] and manufacturers' postwar claims about weapon system performance were overstated, misleading, inconsistent with the best available data, or unverifiable." Nowhere was this more true than in the case of the F-117. The GAO report went on to state that while the F-117's ability to hit its intended targets was between 40 and 60%, an excellent rate for any aircraft, this was a far cry from the Department of Defense's claim of an 80% hit rate.[307] The Air Force used the success of Desert Storm as a platform to launch a push for more low-observable assets. From 1991 forward, no new Air Force fighter or bomber would be placed before Congress or the American people unless it included stealth technology. The force structure that the Air Force believed it needed was a low-observable one. The pursuit of a

[306] GAO Report, GAO/NSAID-97-134, retrieved from www.au.af.mil/au/awc/awcgate/gao/nsaid97134app_11.htm, retrieved on 23 December 2011.
[307] "Operation Desert Storm: Evaluation of the Air Campaign," GAO, GAO/NAIAD-97-134.

modern, low-observable fleet was an intentional move. The question is whether this pursuit was the correct course vis-à-vis a pursuit of expanded emphasis on training exercises. The reformers of the 1970s had advocated fewer technologically advanced aircraft in order to buy higher numbers of cheaper aircraft. The Air Force found itself at a similar crossroads in 1991. The very successful F-4s and FB-111s were due to be phased out in the 1990s, and even the F-15s were more than fifteen years old at the end of the conflict. Would the Air Force choose to procure more F-15s or move on to the next generation of aircraft? With the success of the F-117, it was clear just what that answer would be.

Low-observable aircraft, even in 2013, are designed with one major drawback: to be truly stealthy, the weapons and all fuel stores must be carried internally within the aircraft so as not to present any external features (weapons and fuel tanks) that produce a radar return. Any item hung externally to the aircraft defeated the aircraft's geometric shaping and stealth capabilities. Therefore, if all weapons had to be internal, the overall conventional load out, or the amount of air-to-air or air-to-ground munitions that could be carried, was severely limited in fighter aircraft. The bomber force did not suffer from the same problem since its weapons were generally carried internally anyway. The Air Force planned to purchase the next great low-observable asset in high numbers to defeat the relative problem of its lack of ordnance. Congress would later have other plans.

Of course, the Air Force was not the only one struggling to come to terms with and present the success of Desert Storm in its own preferred light. The countries that had the most to lose in the conflict was, in fact, the Soviet Union (soon to be Russia and the countries of the former Soviet Bloc) since they had provided a large amount of weaponry to Iraq, and those countries that bought Soviet arms saw those weapons soundly defeated. Interestingly enough one of the

major factors focused on by the soon to be defunct Soviet Air Force was the importance their American counterparts had placed on realistic training.

Soviet Observations affect their training

The main enemy of the United States for nearly four decades, at least in terms of how military expenditures and training scenarios were focused during the Cold War, and the major supplier of weapons to Iraq was the Soviet Union. Most Red Flag and Blue Flag training scenarios were based on a conflict with the Soviet Union either in Europe or the Middle East. Understandably, the Soviet Union and the Soviet military followed the Persian Gulf conflict with great interest. It was not lost on Soviet military leaders that this war shared much in common with Korea and Vietnam, where their proxies had great success in many areas against the U.S. Beyond hardware, though, the Gulf War demonstrated how Soviet training fared against western training. The Soviet military recognized that in terms of both technology and training, the USAF far outpaced their own capabilities.

The allied campaign was conducted with American equipment, tactics, and technology, with Iraq using Soviet and French weapons. To a lesser extent, the Iraqis also used French military equipment. This was not, however, simply a matter of the superpowers squaring off with machines and concepts. The Soviets had billions of dollars worth of annual contracts riding on the line. To many, Iraq's success or failure in the war would directly reflect on the Soviet equipment it was using. If the Soviet military systems failed, the Soviets not only lost prestige but money as well. Knowing this, some in the Soviet military began distancing themselves from Iraq and attempted to shift the blame to the French. "Speaking of air defenses," said Major General Kostin of the General Staff Academy, "a significant part of the Iraqi air defenses

electronic network is made up of hardware bought from the French. It cannot be ruled out that French specialists might have shared their secrets with their U.S. colleagues…."[308]

The Soviet Union's initial reaction to Desert Storm was one of shock and delusion. Soviet forces undoubtedly knew that their system and tactics had been defeated by American air power. The Soviets knew the importance that training had played into this defeat is pure conjecture. The Army Command and General Staff College as well as the Air Force's Air Command and Staff College both initiated studies on Soviet responses to the conflict. Although the Americans did not know it at the time, the Soviet Union was near collapse. Years of Soviet party members' lack of change in deference to a system of government that had become a religion, coupled with a crisis in leadership in the early 1980s, left Mikhail Gorbachev in an untenable situation. His military leaders, however, maintained the party line. Many of the initial responses to the air campaign were, understandably and not surprisingly, hyperbolic. Colonel General of Aviation Ye. Shaposhnikov told the newspaper *Krasnaya Zvezda* [Red Star] that Iraq succeeded in dispersion of the Russian-made aircraft. Shaposhnikov failed to mention that the dispersal had been to Iran. [309]

It didn't take long for the Soviets to admit that Iraq had lost the war in short order. Lieutenant General Gorbachev, faculty chief of the General Staff Academy, believed the outcome of the war "had already been determined in the first minutes by the ability of allied air forces to seize the initiative in the air and win air superiority from the outset." Still, Desert Storm provided an opportunity for the Russian Air Force to learn, and the collapse of the Soviet Union also offered tangible benefits to the Russian Air Force in the 1990s.[310]

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[308] "Desert Storm: The Soviet View," Soviet Army Studies Office, Fort Leavenworth, Kans., 10.
[309] "Desert Storm: The Soviet View," Soviet Army Studies Office, Fort Leavenworth, Kans., 6.
[310] "Desert Storm: The Soviet View," Soviet Army Studies Office, Fort Leavenworth, Kans., 3.

The Russian Air Force, the VVS, did not make the same changes the U.S. Air Force did in the 1970s and 1980s. After the collapse of the Soviet Union the Russian Air Force struggled to make concrete changes and began using the American system of training as a model. While that event nearly destroyed the ability of the military to wage war, in the long run it may have been the best thing to have happened to the VVS. When the Soviet Union collapsed, the VVS went into crisis overnight. The Soviet collapse also brought about a significant reduction in the overall force structure of the VVS. While more than a million personnel had served in the late 1980s, a mere decade later the VVS had seen that number drop to 335,000 (roughly equivalent to the size of the Air Force in 2012). However, Benjamin Lambeth makes a compelling case that the Soviet collapse and force drawdown may have done more to help the VVS than to hurt it. In *Russia's Air Power in Crisis*, Lambeth reasones that because the VVS was out from under the umbrella of Communism, it became freer to experiment with how the service conducted training. This new environment allowed the Russian Air Force to make concrete changes that the U.S. Air Force had accomplished after the Vietnam War. Modeling itself and its organizations on the U.S. Air Force's Fighter Weapons School, Red Flag exercise, and aggressor squadrons (themselves built from inflexible Soviet doctrine), the Russian VVS in the mid-1990s was in a position to look at its past mistakes, learn from them, and better prepare for the future. Lambeth argued that VVS squadrons in the past made "no incorporation…of resultant 'lessons learned' into the unit's subsequent training" after an exercise. If the past specter of Soviet bureaucracy was now behind the VVS and it had the ability to adapt its doctrine to Western military practices, then the defeat of Soviet aircraft and doctrine during Desert Storm provided a unique point of embarkation for future development in the Russian air arm.[311]

[311] Benjamin Lambeth, *Russia's Air Power in Crisis*, 91.

Lambeth also asserted that, "because old habits die hard, elements of the Soviet rigidity persist to this day, even though flight activity has been reduced to a near halt because of the budget crisis." The inability of the VVS to conduct operations due to lack of money and fuel seriously hindered the air war in Chechnya. Even though the VVS fell far short of what could be considered a successful air campaign, it did for the first time study its failings and apply this hindsight to future practices. Lambeth reasoned, "The war in Chechnya also revealed parts of the Russian military to be refreshingly honest in owning up to their shortcomings." This new perspective contrasted sharply with the traditional Soviet view of warfare, which included a distinct inability to admit mistakes.[312]

The Russian Air Force watched Desert Storm with great interest, and there is little doubt that organizational changes in the Russian air arm were direct results of the outcome of the conflict. Furthermore, if imitation is the sincerest form of flattery then the U.S. Air Force had reason to feel themselves adulated by the Russian Air Force. The changes made inside the Russian Air Force after the Soviet collapse were built on the American system of training. So it is not a stretch to state that the very exercise conceived in order to defeat the Soviet Air Force was one that the Russian Air Force began to embrace in the 1990s. In 1992 the Russian VVS visited Langley Air Force Base to train with the F-15s of the 1st Fighter Wing. However, for the Russians in the wake of the Soviet collapse, Red Flag was still off limits. That remained the case until the fall of 2012 when for the first time the Russian Air Force planned to travel to Nellis AFB. As the "Voice of Russia" put it "the chance to test modernized Russian aircraft such as the SU -27 SM, SU-30M2, MIG -29SM and other strike aircraft – despite simulations, they are still against real western aircraft and pilots – is too attractive to be miss out on." Still, the Russian Air Force was not the only air force examining its force structure after Desert Storm. The U.S.

[312] Ibid, 109, 131

Air Force finally faced the reality of why there continued to be a separation of strategic and tactical aircraft into two different major commands, if the reality was that air power assets were generally equal and performed the same missions.[313]

Practicality of Air Combat Command

The creation of Air Combat Command in 1992 was a remarkably pragmatic decision on the part of Air Force leaders. It simply made sense. The blurring of roles and missions between strategic and tactical commands since Vietnam showed many observers that the forces then gathered in the two organizations did not need to exist as separate entities in the future. The numerous training exercises that held the "Flag" designation cut across MAJCOM boundaries. SAC and TAC members worked side by side at Red Flag, Blue Flag, Green Flag and other large force exercises. Why should an exercise be the only the only place the separate command's personnel work together? Training exercises followed by combat experience proved there did not need to be two separate commands that contained combat aircraft. Desert Storm had integrated the personnel on planning staffs and air power had functioned well without designating aircraft or air crews as either "strategic" or "tactical." A single unified command presented national decision makers a "one stop shop" for Air Force combat operations.

Strategic Air Command personnel had the most to lose from combining the two commands, but SAC leaders and personnel were more than willing to help create the new command. Members of Tactical Air Command knew that the creation of Air Combat would be perceived as Tactical Air Command's "hostile takeover," of the USAF's leadership Generals McPeak, Butler and Loh went a long way to counter this perception. Despite all that SAC

[313] 1st Fighter Wing Office of History, Wing Command Files, 1992 Russian Visit and exchange program. Files include lists of pilots who visited Russia in 1992 as well as list of Russian Officers who trained at Langley AFB. "Russian Air Force to take part in USAF training exercises," Voice of Russia, retrieved on 3 July 12

personnel had to lose from the merger, many of its officers willingly proceeded with the merger indicating that Air Force officers in both commands recognized just how prudent the new command was.[314]

The idea for the merger of Strategic Air Command and Tactical Air Command did not come about entirely as the result of Desert Storm, but the conflict certainly quickened the process. The perception among senior Air Force leaders in the wake of Desert Storm was that Strategic Air Command had outlived its usefulness. The possibility of nuclear conflict was lessening. An invasion of Western Europe was simply no longer a viable concern as the Soviet Union collapsed and appeared to be losing member states on a monthly basis. Desert Storm showed that, according to an Air Force history, "only [Tactical Air Command] appeared to be organized, staffed, and equipped to handle conventional operations, especially short-notice conventional deployments." The writing on the wall became clear when Chief of Staff of the Air Force General Merrill McPeak, himself a career fighter pilot, asked the redundant question, "Isn't it time to really merge these two commands and get conventional warfighting straight?"[315]

The official Air Force history states that "the most influential factor was a movement inside Air Force circles, which had been gathering momentum since the late 1980s, to streamline, rationalize, and unify roles and missions," an Air Combat Command was going to be led by a fighter, and not a bomber, pilot. Two men led the charge for the creation of what would become Air Combat Command in 1992. The first, ironically enough, was General George Lee Butler, the last commander of Strategic Air Command, as it turned out. It was Butler who initially proposed the merging of the two commands into one. He began his career as a bomber pilot. But, by the midpoint of his career, Butler was a fighter pilot in Vietnam. He flew F-4s

[314] "The Establishment of Air Combat Command," Air Combat Command, 10.
[315] "The Establishment of Air Combat Command," Air Combat Command, 4.

after earning his master's degree from the University of Paris as an Olmsted Scholar. Butler knew the Air Force through both fighters and bombers – he saw things from both the strategic and tactical perspectives.

In April 1991, Butler spoke before Congress on the Air Force's restructuring. While purposefully vague about Desert Storm's implications for the future of Strategic Air Command, he did indicate that changes were forthcoming in the organization. With regard to just what the Air Force would look like in a post-Cold War world, Butler stated:

> The new strategy and its Base Force have several implications for Strategic Air Command. First and foremost, it introduces substantial change in [Strategic Air Command] forces, modernization programs, and contributions to warfighting. These directed changes combine with the lingering uncertainties of budget outcomes, basing structure, arms control, and events in the Soviet Union to make for a complex leadership and management environment. Consequently, I have spent the bulk of my first weeks in office reassessing the corporate vision that has guided [Strategic Air Command] for the forty-five years of its existence. My conclusion is that…the new realities of a changing world order require a fundamental restatement of [Strategic Air Command's] missions and requirements.[316]

The other man who most influenced Air Combat Command's creation was General John Michael Loh. When Iraq invaded Kuwait, Loh was the Air Force vice chief of staff. It was Loh who had taken the initial phone call from Schwarzkopf that eventually allowed the request for air planning to land on John Warden's desk in August 1990. Loh was like more and more of the Air Force leaders after Vietnam, a career fighter pilot and a graduate of the Fighter Weapons School.

[316] General Lee Butler, Presentation to the Committee on Appropriations, Subcommittee on Defense, April 1991.

As vice chief of staff, Loh served under three different chiefs of staff. When General McPeak was appointed the new Chief of Staff following the resignation of his predecessor, General Michael Dugan, Loh was in a perfect spot to provide much needed continuity to the new chief.[317]

Air Combat Command was not created in a vacuum. It was but one piece of a massive Air Force-wide restructuring effort that occurred after Desert Storm. The massive restructuring was accomplished ostensibly due to the merging of roles and missions between the Strategic and Tactical Air Commands, but in reality the restructuring was carried out because Strategic Air Command had ceased to function as a useful entity. As Secretary of the Air Force Donald B. Rice remarked, the idea of "integrated employment of air power is not a new idea. Desert Storm punctuated the point." The initial idea of a single command for all air combat assets originated with the Air Force Chief of Staff and the Commander of Tactical Air Command. The idea was to create one very large air command that would be called "AIRCOM" and composed of all tactical and strategic assets; in other words, the new command would include all of the Air Force's combat aircraft. The name AIRCOM was eventually done away with for the far clearer nomenclature Air Combat Command.[318]

Since Strategic Air Command controlled not only bombers but also the refuelers needed to get the bombers to their targets, something needed to be done with the enormous number of KC-135 and KC-10 aircraft. It was General Loh who suggested that the refuelers get rolled into a second new major command with the existing Military Airlift Command's transport aircraft. This command, originally called simply Mobility Command but later dubbed Air Mobility Command, served two purposes in Loh's mind. First, it moved all mobility assets, including

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[317] General Dugan's resignation was in fact a firing. On a return trip from visiting troops in Desert Shield, his comments to media members on the flight home gave strong indications about what type of air campaign was being planned. Secretary of Defense Cheney asked Dugan to resign.

[318] "The Establishment of Air Combat Command," Air Combat Command, 6-7; General Loh interview, Establishment of Air Combat Command Files, Air Combat Command, 11, 14-15.

transport aircraft and refuelers, into one central location for purposes of planning and execution. Second, at the same time, it assuaged the fears of all those in the Air Force who perceived that a new Air Combat Command would be the "big kahuna command" while the others were relegated to the role of "seven dwarves" serving Air Combat Command.[319]

McPeak initially disagreed with the idea of a separate mobility command. Demonstrating just how sacred Strategic Air Command's way of doing business was in the Air Force, McPeak did not want to separate the bombers from their refuelers, even in 1992, for fear of violating the Single Integrated Operational Plan, the general plan for nuclear war. However, in a later meeting between Tactical Air Command Commander -- General Loh succeeded to this role in March 1991 -- and the heads of Strategic Air Command and Military Airlift Command, Generals Butler and H.T. Johnston, respectively, Loh indicated that he was willing to fight the chief of staff on this point:

> He [Air Force Chief of Staff General McPeak] wants the [Single Integrated Operational Plan] tankers to be in Air Command, but to me that doesn't make a whole lot of sense. It makes sense in one context, but refueling is refueling whether you are refueling an airlifter or a bomber or a fighter. The tactics and all don't seem to be that different. The training we can work together on, but it is more important that we emphasize that there is a mobility culture.[320]

Loh had a valid argument. By assigning all the tankers that had a mission in the Single Integrated Operational Plan mission to Air Combat Command, the command would essentially inherit *all* the tankers. Loh knew that this approach defeated the purpose of a new mobility

[319] "The Establishment of Air Combat Command," Air Combat Command, 6-7; General Loh interview, Establishment of Air Combat Command Files, Air Combat Command, 5.
[320] General Loh interview, Establishment of Air Combat Command Files, Air Combat Command, 9.

command before it even got off the ground. In the end General McPeak relented, and the bulk of the refuelers transferred to the new Air Mobility Command upon its activation.

The process to activate a new command was immense, and, given the size and organization of Strategic Air Command and Tactical Air Command, it bordered on the miraculous that it took only a year from the initial concept until Strategic Air Command, Tactical Air Command, and Military Airlift Command were inactivated and replaced with Air Combat Command and Air Mobility Command. Hierarchically speaking, the chief of staff of the Air Force ran the creation of the new commands, with the commanders of Strategic Air Command, Tactical Air Command, and Military Airlift Command leading their individual organizations towards the goal of the two new commands. Directly beneath Major Command commanders was the General Officer Steering Group, composed of multiple two- and one-star generals who, in turn, led a plethora of committees. Ironically enough, the head of the General Officer Steering Group, Brigadier General Thomas R. Griffith, found members of Strategic Air Command to be more receptive to the inactivation of their command and culture than the members of Military Airlift Command who stood to gain considerably from the creation of Air Mobility Command. Griffith found "the headquarters of [Strategic Air Command] to be energetic, cooperative, and committed to the reorganization, although the command stood to lose its corporate identity after forty-five years as the most visible symbol of United States airpower."[321]

The Air Force went to great lengths to ensure that the perception among those both inside and outside of the Air Force was that the inactivation of Strategic Air Command was not a conquest of that command by Tactical Air Command. In a letter to Senator Sam Nunn, chairman of the Armed Service Committee, from the Air Force's legislative liaison branch, Nunn was told:

[321] "The Establishment of Air Combat Command," Air Combat Command, 10.

> It must be stressed that this restructuring effort is not an exercise designed to absorb Strategic Air Command into Military Airlift Command and Tactical Air Command. Three commands—Military Airlift Command, Strategic Air Command, and Tactical Air Command—are being inactivated. In their place, two new commands are being formed. The new commands will better integrate air assets to enhance combat capability and improve peacetime efficiency.[322]

In a letter addressed to the "Men and Women of Air Combat Command," General Loh, who was the first commander of Air Combat Command as well as the last commander of Tactical Air Command, reiterated that "this has not been a takeover, nor a merger. This is the beginning of a new command. That distinction is important." It is telling that Loh was so overt in an official memorandum to state that the formation of Air Combat Command was not a takeover. Loh went on to state:

> We are tearing down arbitrary barriers which inhibit higher levels of performance and efficiency. Making a big distinction between "tactical" and "strategic" relationships is one of those arbitrary barriers. As we saw in the Gulf War, aircraft like the F-15E can attack targets which have a strategic orientation as well as targets of a tactical nature. We saw the B-52 play both tactical and strategic roles….So why be wedded to an obsolete concept?[323]

Despite all these proclamations to the contrary, it was recognized then and afterward that the creation of ACC was, in fact, an acquisition of Strategic Air Command by the dominant TAC. Although many in SAC met the creation of Air Combat Command with willingness, among the dozens of fighter pilots interviewed for this work, there was a unanimous consensus

[322] Letter to Senator Sam Nunn, Establishment of Air Combat Command Files, Air Combat Command.
[323] Establishment of ACC Files, Air Combat Command, vol 4, Supporting Document 104.

that the inactivation of Strategic Air Command was a deliberate move to consolidate power in the fighter community. Loh's motivations were clear. He recognized that SAC needed consolidation to provide the pilots the career opportunities that would only be found by in a merger. This may be true, but it was also the right move for the Air Force. SAC was a non-player in Desert Storm, and the bombers had only been assigned to roles in which there was no threat of interception by surface-to-air missiles. Furthermore, the B-1 bomber, when finally converted to a conventional bomber, has found its greatest utility not as a bomber at all, but as a large close air support aircraft. Operations in Afghanistan between 2004 and 2012 found the B-1 providing on-call close air support to troops in contact. From that perspective, the B-1 became not so much a bomber as a very large and very deadly attack aircraft. By 1992, there was no need for a Strategic Air Command, or for that matter a separate Tactical Air Command, for the simple reason that there was no longer a difference between strategic and tactical aircraft and operations. They were one and the same.

Strategic Air Command, Tactical Air Command, and Military Airlift Command were inactivated on 1 June 1992. The histories and heritage of the two former organizations ceased to be associated with any active organization. This was an important and deliberate step taken by the general officers who helped create ACC. Air Force organizations and units have traceable histories. Many times when a new organization is created it will have the history of another unit "bestowed" upon it. In the case of ACC neither the history of SAC or TAC was bestowed. This indicated that Air Force leaders recognized that either unit's history would come with unnecessary baggage.[324]

[324] The Air Force Historical Research Agency maintains the "official" history files for every active Air Force Unit: http://www.afhra.af.mil/organizationalrecords/majorcommands.asp. TAC and SAC's histories date to 1946 and 1944 respectively. TAC's history remains on the "inactive" list. Ironically, SAC's history was bestowed on the new Global Strike Command in 2009.

On the same day, Air Combat Command and Air Mobility Command were activated. In essence, the entire concept of "strategic air power" as a clear and separate entity died on this day and was replaced by simply air power. The larger way of envisioning the Air Force's approach to war had come, this time, in a gradual development through the lines of TAC – just as the earlier version at the time of the Air Force's attainment of separate status in 1947 had come along lines developed by SAC. As a GAO report indicated after Desert Storm, "With the Air Force's decision to dissolve [Strategic Air Command], the bomber has lost a strong advocate unilaterally able to underwrite that sizable logistics effort." Still, the remnants of the bomber mafia did not go away, and the procurement of a long-range attack-aircraft remained a mainstay of the Air Force structure into the twenty-first century.[325]

Air Combat Command was a direct result of the training revolution that followed Vietnam and the former members of SAC moved into ACC seamlessly as they reorganized the bomber doctrine and made it fit with what the tactical community had been doing for years. Bombers became large attack aircraft. This position was supported by the B-2's work during Operation Allied Force, as well as the even more recent conversion of the B-1 into a multi-role platform capable of generalized strike and close air support missions, as seen during Operation Enduring Freedom in the years since the 11 September 2001 attacks. However, in 2012 questions remained about the efficacy of large bombers flying in non-permissive environments.

In 2012, the Air Force's bomber fleet was considerably older than its fighter force. The B-52, B-1, and B-2, all long range and large attack aircraft, continued to struggle for roles in modern conflict. The Air Force's replacement for these aircraft, the "next-generation bomber,"

[325] "Limits on the Role and Performance of the B-52," GAO, 6; The Air Force Historical research Institute maintains the lineage and honors statements, the official histories of the two organizations. The lineage of TAC and SAC did not transfer to Air Combat Command. Interestingly enough, when the Air Force activated Global Strike Command, the new command did take SAC's history as its own.

remained in the theoretical realm with no concrete proposals other than to say it would be a medium-sized bomber capable of complementing the existing force structure of fighter aircraft by conducting "deep strike," operations. In 2007, Dr. Rebecca Grant presented a paper to the Air Force Association titled "Return of the Bomber: The Future of Long-Range Strike." In this paper, Grant argued, by quoting a member of the Lexington Institute, that the Air Force "owed its existence to the strategic bombing mission." Furthermore, Grant stipulated that all those who recognized that "air power remains at the core of national security" support the development of the next-generation bomber. Rather than argue that developing the next-generation bomber was the right move for the Air Force because of needs in force structure, Grant and the Air Force Association made the case that a new bomber was necessary because it had always been so, and only those who truly supported national security recognized its true value to the future of air power.[326]

[326] Rebecca Grant, "Return of the Bomber: The Future of Long Range Strike," Special report presented in February 2007 for the Air Force Association, http://www.afa.org/mitchell/reports/0207bombers.pdf

CHAPTER 9 - Deliberate and Allied Force

The value and efficacy of Red Flag and other training exercises continued to be demonstrated after Desert Storm. Red Flag continued to evolve, and its missions changed. Lieutenant Colonel Brian McLean covered several of the changes made to the Red Flag exercises after Desert Storm in his book *Joint Training for Night Warfare* (1992). During the 1990s, emphasis was placed on night flying operations and on increasing the number of aircraft participating to more accurately reflect combat operations where dozens, if not hundreds, of aircraft would be operating at the same time. Red Flag personnel also moved to have each exercise conducted by a particular Combatant Command so that each squadron participating in a particular exercise would train alongside the squadrons they would be with during combat. Training exercises in the U.S. continued to prepare pilots for combat, but now, more than five years after Desert Storm, the newest fighter pilots had not faced combat in the Persian Gulf. The new pilots who commissioned in the early 1990s flew on the wings of Desert Storm veterans and faced scenarios at Red Flag based on missions in Iraq much as the more senior pilots did with the Vietnam veterans in the early days of Red Flag. Air Force pilots' aptitude to plan and execute very complicated missions in the confined air space that was the Nellis Range faced similar issues over the former Yugoslavia. Every Red Flag training mission and every continuation training sortie (the missions conducted daily at an aircraft squadron's home-station) prepared American pilots for what they would face in the Balkans. Although the Air Force continued to train pilots for combat operations, the Air Force slipped when it came time for operational level

action. Red Flag remained the crown jewel, but preparation at the operational training exercise Blue Flag did not live up to the standards set by Red Flag.[327]

After Desert Storm, there were those who saw the Air Force as the only service that mattered and believed it could attain results without the other military branches, and perhaps this is a reason for the lack of similar outcomes in the Balkan operations. Although each of these conflicts was "won," these victories did not come as fast as success had come in Desert Storm. Eminent historian John Keegan even went so far as to say, "There are certain dates in the history of warfare that mark real turning points [including] June 3, 1999, when the capitulation of President Milosevic proved that a war can be won with air power alone….All this can be said without reservation, and should be conceded by the doubters….This was a victory through air power." [328]

Other air power advocates echoed Keegan's work including Richard Hallion in *Storm Over Iraq* where he stated that "total dominance" was enjoyed over the "two-dimensional sea and land surface by the three-dimensional attacker." This tendency to inflate air power's contributions in Desert Storm led to serious mishandling of air assets in the confrontations of the mid- to late-1990s, and this was one reason the Air Force found it difficult to train properly for the scenarios they faced. The Air Force was asked to achieve too much, and the burden fell not to the fighter pilots but to the mid-grade pilots who found themselves on planning staffs. First, it should be noted that the uses of air power after the Persian Gulf War occurred in significantly different types of conflicts. They were not major combat operations. In fact, the most significant doctrinal references call them operations other than war. Most notably, leaders of NATO-led operations began to think that air power really could win a war solely on its own.

[327] Brian McLean, *Joint Training for Night Air Warfare*, Maxwell AFB, AL: Air University Press, 1992, 69
[328] John Keegan, "Please, Mr. Blair, never take such a risk again," London Daily Telegraph, Issue 1472, 6 June 1999; Richard Hallion, *Storm Over Iraq*, ix.

Trying to act on the basis of this assumption would prove to be folly. If changes in training after Vietnam contributed to the success of Desert Storm, how did those same training changes affect the later conflicts of the 1990s? After Desert Storm, the Air Force overlooked its own successes in training and operational art and instead relied mostly on technological innovation and the belief that air power could accomplish more than any other military service. In the Balkans, it was the operational-level Blue Flag exercise and not Red Flag that was put to the test.[329]

Iraqi No-Fly Zones: Northern and Southern Watch

Some Air Force leaders believed that Operation Desert Storm had never really ended for the Air Force. A letter written in 2012 by Lieutenant General David Goldfein, the Air Forces Central Commander stated that the conflict with Iraq was a continuous operation that had lasted more than twenty years. The scale and scope of the operation were significantly less, but members of the Air Force believed that they were left holding the line against Saddam's battered military. While significant combat had ended, the logistics necessary to keep aircraft operating in theater did not get any smaller from what it had been during the campaign. The Air Force continued to need aircraft maintenance crews, logistics personnel, and a plethora of other support personnel in the Gulf to conduct daily flying operations. Even as some American pilots were engaged in the Balkans, others deployed to the Middle East to contain what was left of Saddam's forces. These rotations to the Middle East to keep Saddam's forces boxed in were less useful operations than a Red Flag training exercise. The no-fly zones contained Saddam's forces in the county's interior, but the deployment was an additional one for American pilots and was not well liked. American pilots split their time in the 1990s. While at home station they performed continuation training, attending Red Flags and other live fire exercises including Combat

[329] Richard Hallion, *Storm Over Iraq*, ix.

Hammer and Combat Archer where the munitions leaving the rails were real. When not honing their skills in the U.S., the fighter squadrons and support aircraft rotated through the Central Command. Beginning with the ceasefire on 3 March 1991, Desert Storm gave way to the northern and southern no-fly zones. The no-fly zones, for the most part, proved to be little more than opportunities for pilots to "drill holes in the sky," as the pilot parlance went. The operations did provide some combat experience for some pilots flying any given mission when Iraq ill-advisedly attempted to violate the zones. After the war ended a pilot faced more of a "threat" at a Red Flag than he had faced from what remained of Saddam's air defense systems. Despite the success of realistic training exercises back in the U.S., one incident demonstrated that both training and technology could fail with disastrous results.[330]

The no-fly zones were initiated after Iraqi helicopters began using chemical weapons against forces opposed to Saddam's regime in southern Iraq. Furthermore, Iraqi fighters began flying sorties as well. In response, General Schwarzkopf ordered Air Force fighters back into Iraqi airspace to ground the Iraqi Air Force.

There is a comparison to be made between the no-fly zones and Red Flag exercises. During Red Flag training exercises, there were certain unrealistic aspects of the training that had to be included. At Red Flag, although the aggressor aircraft took-off from Nellis AFB, during the actual exercise they flew over "off limits" areas to the Blue Force (attacking) pilots. These were the simulated enemy airfields where the aggressor aircraft were "based." Attacking pilots could not enter this airspace and had to wait for the aggressors to "launch." It was an unrealistic, but necessary, exercise simulation. It allowed aggressors an area to form up or to "regenerate" after being shot down. Obviously, attacking pilots knew where these airfields were and

[330] David Goldfein, "A Letter From Iraq," *Combat Edge*, Spring 2012, 5-7; William Arkin, "Chronology of No-Fly Zones Over Iraq," unpublished manuscript held at Air University's Curtis LeMay Doctrine Center; Air Forces Central Command holds the lineage and honors for the former 9th Air Force.

positioned their aircraft to engage the enemy as soon as they were a threat. During the no-fly zone operations, American pilots monitored Iraqi airfields and waited for an aircraft to take off exactly as they waited over the Nellis ranges for the aggressors. As historian Dan Haulman stated, "Such tactics discouraged the Iraq pilots from flying."[331]

These "look down-shoot down" engagements began on 20 March 1991, when an F-15C shot down an Iraqi fighter aircraft. Two days later on 22 March, an F-15C shot down an Iraqi SU-22 near Kirkuk in northern Iraq. On the same day, another American flyer literally intimidated an Iraqi pilot into ejecting from his aircraft shortly after taking off rather than engage with the American flyer. These incidents proved to be the last time Iraq attempted to launch aggressive aircraft for the next year.[332]

These early signs of Iraqi desire to be more aggressive proved to American airmen that combat operations, at least for the Air Force, had not ended with the ceasefire. Throughout the rest of 1991 and into 1992, Air Force fighter aircraft continued to patrol both northern and southern Iraq. In response to the Iraqi government's continued use of helicopter-borne weapons against civilians, the coalition members instituted a complete no-fly zone in Iraq beginning in the summer of 1992. In December 1992, Lieutenant Colonel Gary North garnered a number of firsts when he shot down an Iraqi MiG-25. It was the first F-16 air-to-air kill and the first use of the AIM-120 as a beyond-visual-range kill. However, in one incident, training and technology failed, resulting in the death of 26 military members.[333]

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[331] 57th Fighter Wing History Office, Red Flag files, Red Flag mission Brief, 27 Jan 06; Haulman, Daniel L. "No Contest: Aerial Combat in the 1990s," Paper presented at the Society for Military History meeting at the University of Calgary, Calgary, Alberta, Canada, in May 2001, p. 7

[332] William Arkin, "Chronology of No-Fly Zones Over Iraq," unpublished manuscript held at Air University's Curtis LeMay Doctrine Center.

[333] Ibid

On 14 April 1994 two F-15s incorrectly identified two UH-60 "Black Hawks" as Russian Mi-24 "Hinds." American AWACS confirmed the helicopters as enemies and the F-15s fired two AIM-120 missiles. Both helicopters were destroyed. The AWACS controllers failed to notice that their scopes showed the helicopters as friendly, and the two F-15 pilots failed to correctly identify the helicopters during a visual inspection fly-by. Former Army officer and Harvard professor Scott A. Snook noted in his book *Friendly Fire: the Accidental Shootdown of U.S. Black Hawks over Northern Iraq* (2000) that both F-15 pilots were "highly trained, technically qualified, and well-respected officers with hundreds of hours experience in the aircraft." Likewise, the AWACS controllers were "trained and equipped to track literally hundreds of enemy and friendly aircraft during a high-intensity conflict…." After the incident the investigating board looked into the "training and readiness programs" in which the pilots had participated. The final report of the investigation did not blame technology; rather it stated that "neither F-15 pilot had received recent, adequate visual recognition training." [334]

Over the next decade, American forces continued to patrol the Iraqi northern and southern no-fly zones. These operations often turned hot when Iraq would launch aircraft or turn on surface-to-air missile radars, and American forces responded by destroying the Iraqi weapons systems. The operations in Iraqi no-fly-zones proved useful because they allowed American airmen to gain combat experience in a low-threat environment, but they were did not prove as effective as participation in Red Flag training exercises in honing needed combat skills.

[334] Scott A. Snook, *Friendly Fire: The Accidental Shootdown of U.S. Black Hawks over Northern Iraq* (Princeton, NJ: Princeton University Press, 2000), 8; GAO, "Operation Provide Comfort: Review of U.S. Air Force Investigation of Black Hawk Fratricide," retrieved on 20 March 13: http://www.fas.org/man/gao/osi-98-013.htm

The Balkan Campaigns

As Lieutenant Colonel Brian McLean noted in *Joint Training for Night Air Warfare* (1992), Red Flag continued to modify exercise scenarios and increased the focus on night operations after Desert Storm. This expanded an existing gap between American pilots and the other allies in the area of combat training. Air Force Colonel Cesar Rodriguez stated there was a tremendous gap in capabilities between the U.S. and the other members of NATO that emerged during Operations Deny Flight, Deliberate Force, and Allied Force. Colonel Rodriguez said that American pilots "benefited from a nation willing to invest in the latest technologies and training." Foreign nations may have participated in American training exercises, but they did not attend as often as American airmen for whom the realistic training was an integral part of their annual training. Air Force historian Dan Haulman stated that the enemy faced during the Balkan campaigns was outclassed in every regard because they "lacked much experience in aerial combat and did not train for it as extensively as did the USAF." [335]

Although Balkan conflicts discussed here were NATO-led operations, in every instance the senior air commanders were U.S. Air Force officers, and it was the U.S. Air Force that brought the preponderance of air assets, followed closely by the Navy. It would therefore not be inaccurate to say, although irritating to some of the participants, that the Balkan air wars were Air Force-led operations. The conflicts continued to demonstrate that realistic training events prepared pilots and planners well for combat but that political considerations often hindered operations.

The complex situation faced by Air Force planners demonstrated the limits of some training programs, most notably Blue Flag. NATO involvement into the existing Balkan

[335] Colonel Cesar Rodriguez, Interview with author, 27 Nov 11; Haulman, Daniel L. "No Contest: Aerial Combat in the 1990s," Paper presented at the Society for Military History meeting at the University of Calgary, Calgary, Alberta, Canada, in May 2001,p. 3

conflicts was part of United Nations operations inside the former Republic of Yugoslavia. From the time of Josip Broz Tito's death in 1980 through the country's fracture and fragmentation in the early 1990s, Yugoslavia broke along the fault lines of race, culture, and religion. Basically, beginning in the summer of 1991, Yugoslavia disintegrated when Slovenia and Croatia declared independence, followed later in the year by Macedonia and Bosnia. Each of these regions was independent by the mid-1990s, or semi-autonomous for lack of a better term. The states and regions of the former Republic of Yugoslavia included Serbia, Kosovo, and Montenegro under the presidency of Slobodan Milosevic. Milosevic's military arm in the early part of the conflict was the Yugoslav People's Army, or the JNA derived from the Cyrillic alphabet. The JNA fought to bring the breakaway countries back into the fold, although the JNA viewed them not as countries at all but as rebellious districts. The effort was to no avail. The JNA, ethnic Serbians, Bosnians, and Croatians went for each others' throats. The conflict was bloody with mass murder, rape, burning of cities, and the forced relocation of civilians. The conflict became violent quickly and produced a new term that coincided with the ongoing genocide: ethnic cleansing. Into the conflict descended United Nations protection forces, and for the first time in its history, NATO entered a conflict as well and U.S. Air Force planners were asked to accomplish tasks that they were not properly trained to do.[336]

In the beginning, NATO believed that air power could at least keep Serbian aircraft from bombing civilian targets and perhaps even stop the shelling of civilian populations by Serbian artillery. After hundreds of Serbian aircraft violated a United Nations no-fly zone, Operation

[336] Robert C. Owen, "The Balkans Air Campaign Study Part 1," Air Power Journal, vol. 11, no.2 (1997); www.**air**power.au.af.mil/**air**chronicles/apj/apj97/sum97/owen.pdf; Robert C. Owen, "The Balkans Air Campaign Study," Air Power Journal, vol. 11, no.3 (1997); http://www.airpower.maxwell.af.mil/airchronicles/apj/apj97/fal97.html; Robert D. Kaplan, *Balkan Ghosts: A Journey Through History* (New York: St. Martin's Press, 1993); Yugoslavia began to break apart in 1989 when Serbia declared independence but it was the departure of Slovenia and Croatia that led to NATO and American involvement in the region.

Deny Flight, under NATO's command, went into effect. Deny Flight was the first of three major air operations in the Balkans. During this period, between 1994 and 1999, the Air Force shot down nine aircraft, including five kills attributed to the F-16, which was coming into its own as a fighter aircraft. The lopsided destruction of enemy aircraft demonstrates the preeminence of American training, but the overall manner in which these campaigns were carried out convinced many in the Air Force that there had not been proper preparation for operations that were not state-versus-state conflicts. From that perspective the operational command and control exercise Blue Flag showed its limitations.

The training of Air Force personnel to conduct operational-level engagements was done at Blue Flag. According to Air Combat Command's office of history the Blue Flag exercise was designed to "train combat leaders and supporting battle staff personnel in command, control and intelligence procedures for specific theaters of operation." In other words, it taught personnel how to plan for and conduct a large-scale operation. Balkan operations put that training to the test. One of the primary problems in each of the three conflicts during which air power was used was a lack of clear understanding as to who the enemy was or, for that matter, even if there was a single cohesive enemy. As the Balkans Air Campaign Study pointed out, if the conflicts were caused by the political machinations of Milosevic, then a certain set of targets presented itself. However, if the conflicts could not be pinned entirely on Milosevic with both sides sharing an equal amount of blame, then there was really nothing to target. The former calls for destruction of military targets of a particular regime, something Blue Flag participants trained for. The latter calls for mediation and separation and not the destruction of targets. Both scenarios drew on very different planning processes. The reality was that the early operations did nothing more than monitor Serbian excursions into the no-fly zone; the planners entered into the conflict unsure of

exactly what their mission entailed. Several hundred of these incidents occurred before the UN gave permission to keep all flights from entering the area. From that perspective, Air Force planners had ample time to come up with an air campaign plan.[337]

Deny Flight

Because the experience in Desert Storm made many Americans see air power as capable of independent action, many U.S. leaders thought of air power as an independent means of responding to various international problems in the 1990s. In April 1993, the Air Force, as part of a NATO operation, began conducting no-fly zones over Bosnia and Herzegovina. The first operation was Deny Flight, which entailed keeping the Serbian Air Force from attacking the Bosnians on the ground. One of the problems was that neither NATO nor the U.S. Air Force had an existing plan for major combat operations in Bosnia. The staff members of the Blue Flag exercise had focused on possible Soviet operations during the 1980s but, when the Soviet Union collapsed, those responsible for Blue Flag focused instead on scenarios for operations in the Middle East. A conflict in the Balkans had never been seriously tested in the training environment. The existing operations plan did not cover full-scale operations and had to be modified heavily.[338]

If Blue Flag was found lacking, Red Flag was not and it continued to prepare pilots for combat. On 28 February 1994, four F-16s of the 526th Fighter Squadron operating from Ramstein Air Base were vectored by an AWACS aircraft towards six J-21 Jastrebs and two J-22

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[337] Robert C. Owen, "The Balkans Air Campaign Study Part 1," Air Power Journal, vol. 11, no.2 (1997). www.airpower.au.af.mil/airchronicles/apj/apj97/sum97/owen.pdf; Robert C. Owen, "The Balkans Air Campaign Study," Air Power Journal, vol. 11, no.3 (1997). http://www.airpower.maxwell.af.mil/airchronicles/apj/apj97/fal97.html; ACC, Blue Flag Files, Blue Flag "fact sheet," also available at http://www.505ccw.acc.af.mil/library/factsheets/factsheet.asp?id=15317

[338] Robert C. Owen, "The Balkans Air Campaign Study Part 1," Air Power Journal, vol. 11, no.2 (1997). www.airpower.au.af.mil/airchronicles/apj/apj97/sum97/owen.pdf; Robert C. Owen, "The Balkans Air Campaign Study," Air Power Journal, vol. 11, no.3 (1997), 55, Benjamin Lambeth, *The Transformation of American Air Power*, 180.

Oraos flying in the vicinity of Banja Luka. The Banja Luka incident validated the creation of the AIM-120 missile after the AIMVAL/ACEVAL tests and clearly demonstrated that the need for a "fire-and-forget" missile learned during the early Red Flags was correct. After two attempts via radio to force the aircraft from the no-fly zone with no results or response, the enemy aircraft dropped munitions on the town of Novi Travnik. The F-16s were cleared to engage the aircraft and in the subsquent dogfight expended both AIM-120 and AIM-9 missiles. The enemy aircraft realized that they were under attack only after the first aircraft exploded. They attempted a variant of the beam maneuver by dropping to a few hundred feet off the ground, hoping that the F-16s' radar would lose them in the ground clutter. However, the heat-seeking AIM-9s had no trouble discerning the heat signature coming from the enemy aircraft. It was a classic "4 v. 8" scenario practiced during Red Flag and other exercises. The F-16 pilots first fired the long-range AIM-120s and without the need to keep their radars focused on the targets switched to the heat-seeking AIM-9s were used for the closer-in kill.[339]

Deliberate Force

The Balkan campaigns proved that the Air Force's training programs were not perfect. The Air Force's Balkans Air Campaign Study found that "a political breakup, in and of itself, provides few targets against which air strategists may ply their trade." Nor did Air Force planners ever receive clear guidance as to what the end state should be other than that the combatants were no longer actively killing each other. This proved a difficult goal to attain for air planners who had been trained in state-on-state combat scenarios. Instead, the planners had

[339] Benjamin Lambeth, *The Transformation of American Air Power*, 180; AFHRA, Aerial Victory Credits for Banja Luka incident credited to Captains Stephen L. Allen (x1)and Robert G. Wright (x3), http://afhra.maxwell.af.mil/avc_query.asp ; Robert C. Owen, *Deliberate Force: A Case Study in Effective Air Campaigning* (Maxwell AFB, AL: Air University Press, 2000).

to rely on a series of varying policy goals that were a combination of statements by UN, American, and senior NATO leaders.[340]

It would be useful to note which theories the Deliberate Force planners drew from to put their target list together and how they conceptualized the operation. But evidence demonstrates that they did not clearly invoke the existing theories for either. The Balkans Air Campaign Study clearly notes the dominant theories from which the planners could have drawn at the time: Robert Pape's denial strategy (thwarting the enemy's military plan), Warden's five rings (the destruction of the enemy's key centers of gravity), or the effects-based "system of systems" approach to targeting. However, none of these theories were used. During the Blue Flag exercises, participants were exposed to how to run an air campaign, but they were not taught different methods for conducting a campaign. In fact, the Balkans Air Campaign Study states that "for all the potentially useful guidance and reassurance these three concepts could have offered, neither Pollock nor other members of the Balkans Air Campaign Study team uncovered oral evidence that Allied Air Forces Southern Europe (AIRSOUTH) planners had any working knowledge of them." A far cry from the deliberateness and focus on the air campaign during Desert Storm planning, the lead up to Deliberate Force indicated nothing more than picking targets that might cause a specific and separate desired effect to be achieved; the only effect that seemed to matter was to get two sides to stop shooting at each other. There was no clear indication that the planners had any overall concept of what they expected to achieve or how they were going to achieve it. To put it bluntly, the Air Force planners were not trained to conduct the *type* of air campaign they faced; the air operations in the Balkans were not an indictment of Blue Flag's ability to prepare mid-grade officers to conduct air operations. It was

[340] Ibid, 7

never the intention for those who participated in the exercise to be constrained by the United Nations' and NATO's requirements during the operation. [341]

Historian Robert Owen indicated in an article "The Balkan Air Campaign Study" that prior to Deliberate Force, NATO and the U.S. Air Force pushed "for aggressive and strong air strikes, while most other intervention partners and the leaders of the UN called for caution and restraint." The rub was that the NATO and U.S. Air Force planners had no clear objectives and no clear idea how to carry out an air campaign. Blue Flag trained personnel how to conduct a large-scale air campaign but not how to fight a war based on a strategy of attacking targets as they emerged. Although attacking targets as they emerged did have a demonstrable effect all their own, it was not something Air Force personnel were trained to accomplish at Blue Flag. [342]

Allied Force

While Deny Flight and Deliberate Force showed the growing gap between American training and other allies preparation, Allied Force demonstrated that the transformation that had occurred in the Air Force's Combat Search and Rescue (CSAR) mission set. Allied Force began as a means to force President Slobodan Milosevic to stop the ethnic cleansing he had ordered in Kosovo. Allied Force provided examples that Red Flag still worked, especially when it came to the ability of rescuing pilots from hostile environments. It also demonstrated that the CAS exercises known as Air Warrior and the advanced training received at the Fighter Weapons School provided important experience as well. The CSAR missions were conducted by Air Force special operators known as pararescue jumpers. These missions had been practiced at Nellis AFB from the earliest days of Red Flag. More than any other mission type, the training

[341] Robert C. Owen, "The Balkans Air Campaign Study," Air Power Journal, vol. 11, no.3 (1997). http://www.airpower.maxwell.af.mil/airchronicles/apj/apj97/fal97.html, 11; John Warden, The Air Campaign, 109-127; 505th Command and Control Wing, Blue Flag "Fact Sheet," retrieved on 14 Mar 13, http://www.505ccw.acc.af.mil/library/factsheets/factsheet.asp?id=15317

[342] Robert C. Owen, The Balkan Air Campaign Survey Summary, 16.

conducted to pick up a downed pilot in hostile territory was tested during Allied Force. The training proved worth it. The realistic training exercises of Red Flag and Air Warrior used A-10s and rotary wing assets to rescue downed personnel. Between 1980 and 1990, the annual CAS Red Flag and the block on command and control taught at the A-10 weapons school changed the way the Air Force conducted rescue operations. Never before had Air Force personnel and assets been able to conduct a rescue operation in such a highly contested threat environment as the one found in Serbia.[343]

The threat environments tested at the Red Flag exercise mirrored what had been seen during Allied Force. During the air war over Serbia in 1999, NATO was unable to completely destroy Yugoslavia's surface-to-air missile capability. Historian Daniel Haulman stated at a gathering of the Society of Military History in 2001 that "Surface-launched missiles and antiaircraft guns continued to present much more of a threat to [Air Force] aircraft than enemy aircraft. Enemy fighters sometimes served only as bait to lure Air Force fighters into areas with heavy concentrations of surface-to-air missiles and antiaircraft artillery."[344]

The bombing of Serbia provided another useful example of how differences between strategic and tactical no longer mattered and how the training practiced at Red Flag was very close to combat operations. F-117s flying early in the conflict struck underground command and control bunkers, military barracks, radio relay stations, and other targets that served both strategic and tactical significance. Each target, regardless of its nature, was just something that needed to be destroyed or disabled and moved NATO closer to ending the campaign. The B-2 bomber also saw its first combat missions during Allied Force, flying from its home station in Missouri and returning home rather than be stationed overseas. The B-2 had entered into the

[343] ACC, Red Flag Files, Red Flag V Final Report, 6 Jul 76, 1
[344] Haulman, Daniel L. "No Contest: Aerial Combat in the 1990s," p. 8

Red Flag exercises in the summer of 1995 and also participated in second Red Flag a few months later. The Air Force deployed the B-2 to Red Flag events more often than other fighter squadrons in its earliest days to ensure it was prepared to enter actual combat which it did in 1999. Still, this was not a return to the days of strategic bombardment. The bombers now fell under Air Combat Command and executed deep strikes against targets. What mattered was a target's destruction, and, consistent with that objective, aircraft were assigned based solely their ability to carry out a particular mission and not because of what command they belonged to.[345]

The combat search and rescue missions provided an excellent case study of just how much realistic training was important to actual operations. The type of training necessary to perform the CSAR mission was far more important than the types of technologies used in the actual rescues. Although CSAR operations were an important task during Vietnam, Red Flag helped perfect the entire mission set. Red Flag exercises had included combat search and rescue operations since 1976, and these CSAR missions proved to be a mainstay of the exercise for the next decade and a half. Outside of Red Flag, those select pilots chosen to go to the Fighter Weapons School were also exposed to training for CSAR operations, particularly A-10 pilots. Lieutenant Colonel Chris Haave stated in his book *A-10s Over Kosovo* (2003) that graduates of the weapons school became qualified to lead CSAR missions and that CSAR qualified airmen ranked at the top of U.S. and NATO "must have capabilities" when planning for combat. CSAR qualified commanders are given the coveted call sign of "Sandys," which has lineage tied to rescue efforts during Vietnam. Lieutenant Colonel Haave stated that "Due to the difficulty and complexity of the mission, only the most experienced and capable A-10 pilots are selected to train as Sandys." Training to lead a CSAR mission was among the most mentally challenging

[345] Benjamin Lambeth, *The Transformation of American Air Power*, 184-188; John A. Tirpak, "With the First B-2 Squadron, Air Force Magazine, Vol. 79, No.4, April 1996

mission sets learned by combat pilots. Lieutenant Colonel Haave said that these pilots must "use exceptional judgment to find and talk to the survivor without giving away information to the enemy, who may also be listening or watching. The Sandy must have an extraordinary situational awareness to keep track of the survivor, numerous support aircraft, rescue helicopters, and enemy activity on the ground."[346]

There is a direct link between the rescue efforts in the Balkans and those practiced at Red Flag and at the Fighter Weapons School; exercise parameters during a search and rescue training mission anticipated the rescue of downed pilots in Serbia perfectly. More importantly, the rescue efforts demonstrated that realistic training was as important as the technology needed to go in and rescue a downed pilot. The combat search and rescue efforts to retrieve Major Dale Zelko after he was shot down by surface-to-air missiles began long before he ever took off on his mission.

"VEGA-31 is going down!"

The importance of training over technology was demonstrated during the largest search and rescue effort since the Vietnam conflict. One of the benefits of Red Flag proven during this particular rescue effort was the value of training with different types of aircraft. Air Force pilot Lieutenant Colonel Brian McLean said in his book *Joint Training for Night Air Warfare* (1991) that Red Flag "exposes the participants to more than one type of aircraft, the participants learn what skills and capabilities can be provided by other types of aircraft and crews." During the search and rescue efforts, Red Flag graduates knew where each and every aircraft would be

[346] Air Combat Command, Red Flag Files, Red Flag II Final Report, 2-5; It is nearly impossible to compare rescue efforts that occurred in SEA and later conflicts. There were 831 cases of USAF combat rescues during conflicts in SEA versus the few cases that occurred in the Balkans, or for that matter in Iraq as well. and there is no record of failed rescue attempts. Still, rescue training was an important mission type conducted during Red Flag exercises. Southeast Asia Review Final, 22; Chris Haave, A-10s Over Kosovo, 3.

located by altitude and exactly what type of mission the pilot of that aircraft would be responsible for. Another mission taught at Red Flag that was used during this rescue effort was the ability to conduct operations at night. In the fall of 1991, after Desert Storm proved the importance of operating at night, Red Flag moved its PM "go" to a night "go" to train pilots in night time operations. Lieutenant Colonel McLean indicated that conducting operations during periods of darkness allowed pilots to coordinate their "timing to achieve a more effective overall mission package." This effectiveness in timing proved its worth in the rescue of Lieutenant Colonel Dale Zelko. [347]

On the night of 27 March 1999, Lieutenant Colonel Dale Zelko had just finished his bombing run over Serbia in his F-117 when the unthinkable occurred. In addition to the standard survival equipment Zelko carried, he also had an American flag tucked under his flight suit given to him from the senior airman who prepared his target package that night. It has long been tradition in the Air Force for pilots and air crews to carry American flags with them during missions to be used as mementos. Zelko noticed two, if not more, surface-to-air missiles closing in on his aircraft. The first one passed extremely close to the front of his aircraft, surprising the pilot that its proximity fuse did not engage to detonate the missile. The second surface-to-air missile exploded near the rear of the aircraft, which sent the aircraft into a violent negative-G situation and forced Zelko to eject. Colonel Elwood Hinman, a member of Zelko's squadron, later said that, "if we had to pick one man we wanted to be in that situation, it would have been Zelko." Zelko was the Forty-Ninth Fighter Wing's life support officer. His day-to-day job,

[347] Brian McLean, *Joint Training for Night Air Warfare*, Maxwell AFB, AL: Air University Press, 1992, 65-67.

outside of the cockpit, was to train each pilot in ejection procedures and how to handle his survival equipment for this very situation.[348]

Less than a minute after ejecting and floating down under his canopy, Zelko made the following radio transmission: "Mayday. Mayday. Mayday, Vega-31." Other aircraft in the vicinity and the large NATO airborne warning and control system aircraft orbiting nearby immediately picked up the transmission and responded with: "Magic-86, on guard, go ahead." The response stopped anyone who received the message dead in their tracks: "Roger, Vega-31 is out of the aircraft! Downed." The pilot of another F-117, Vega-32, captured the entire episode on his radio, including the extremely shrill locator beacon that sounded as Zelko floated down towards Serbia. The fact that Zelko was using a short-range radio intended only for communicating with aircraft orbiting nearby meant that, once he became a downed pilot, he had difficulty contacting the airborne warning and control system aircraft again. A nearby KC-135 refueler began relaying the messages from Zelko to the airborne warning and control system aircraft. The only aircraft that seemed to be hearing all of the communications between Zelko, the air refueler, and the NATO airborne warning and control system aircraft was another F-117. This stealth pilot transmitted to the airborne warning and control system aircraft to "start the [combat search and rescue] effort." A member of the combined air and space operations center team on the combat operations floor said, "You could have heard a pin drop when we realized it was a stealth." Immediately after the moment of stunned silence, all hell broke loose as a massive rescue operation was set in motion. [349]

At roughly the same time, Dale Zelko landed roughly five miles west of Belgrade and south of the town of Ruma; his location so close to Belgrade indicated to rescue officers that this

[348] Hinman, Ellwood P. Interview with author. 15 November 2011; John Andres Olsen, *A History of Air Warfare*, 234.
[349] Dale Zelko, transcript of speech in author's collection.

would be a very difficult mission. Zelko's landing site was little more than flat farm field which meant it would be extremely challenging for the downed pilot to find somewhere suitable to camouflage himself and wait for the rescue mission to arrive. Beyond that, Zelko landed within two miles of the wreckage of his aircraft, meaning that he was in the heart of the search efforts conducted by the Serbian Army to find him before the American combat search and rescue team arrived. Zelko moved from his landing site into a small irrigation ditch that provided the only land cover between two plowed farm fields.[350]

Major Ellwood Hinman was scheduled to fly in the "second go" of F-117s that night. When he entered the squadron, it was, in his words, "complete chaos." Two problems immediately greeted Hinman and every operational officer at Italy's Aviano Air Base that evening. The first was the rescue attempt to go and get Zelko out of enemy territory. The second was whether to bomb the wreckage to ensure that its components did not fall into enemy hands. Hinman volunteered for the second mission. However, for two reasons, the bombing mission never took place. First, every airborne tanker was diverted to support the rescue mission. Second, the proximity to Belgrade, Serbia, meant that local and international news stations arrived at the crash site quickly. In fact, by the time Hinman was preparing to taxi his aircraft, CNN had already broadcast the images of the F-117's wreckage burning in a field. The tail flash clearly indicated an F-117 had been shot down. With dozens of civilians at the crash site, there was no way the Air Force could destroy the aircraft without incurring civilian casualties.[351]

While the F-117 pilots of the Eighth Fighter Squadron at Aviano Air Base struggled to decide what their next steps should be, a pilot from a nearby A-10 squadron showed up to collect

[350] Dale Zelko, transcript of speech in author's collection.
[351] Ellwood P. Hinman, interview with author, 15 November 2011, John Andres Olsen, A History of Air Warfare, 234.

as much information on the downed pilot as possible, including his "isolated personnel report," which contained information only the downed airman would know and, more importantly, would be able to remember even under extreme duress. The A-10 pilot then took the isolated personnel report information to the flight line and handed to the first two A-10 pilots readying to take off in support of the rescue mission.[352]

The rescue of Zelko involved dozens of aircraft and demonstrated the kind of timing and coordination during night operations that had been emphasized at Red Flag after Desert Storm and the importance of pilots training with different types of aircraft that had differing capabilities from their own. Furthermore, because of training exercises like Red Flag and home station continuation training, each pilot knew exactly how close he or she could push their aircraft into the Serbian defense system. After the first launch of aircraft that night, all other missions had been cancelled due to weather. After the F-117 was shot down, more than a dozen airborne assets were re-tasked to participate in the rescue. These assets included at least two airborne warning and control system aircraft (NATO and Air Force); three intelligence, surveillance, and reconnaissance assets; an RC-135 Rivet Joint; an RC-135 Compass Call; a U-2; an EC-130E airborne command and control center; four F-16 CJs that provided on-scene command until the arrival of the A-10s; and finally USMC EA-6Bs that each provided unique capabilities to the rescue of one downed individual. The KC-135 refuelers, which normally circled in pre-planned orbits well outside of any enemy threat, pushed closer to Serbia and the threat of enemy MiGs to

[352] Christopher E. Haave and Phil M. Haun, eds., *A-10s Over Kosovo: The Victory of Airpower Over a Fielded Army as Told by the Airmen Who Fought in Operation Allied Force* (Maxwell Air Force Base, Ala.: Air University Press, 2003), 214-230; Darrell Whitcomb, "The Night They Saved Vega-31," Air Force Magazine, December 2006; Dale Zelko, transcript of speech in author's collection.

ensure the A-10s, which had to refuel, were able to safely "chainsaw" back and forth to the refuelers while leaving one pair on station over Zelko.[353]

Part of the rescue effort was the authentication of the downed pilot through the isolated personnel report information already obtained by the A-10 pilots who provided on-scene command. This process involved asking the pilot a series of questions to which only he would know the answers. In the case of Zelko, a self-proclaimed numismatist, it was his favorite coin. Zelko responded with the "Mercury dime." This answer allowed the on-scene commanders to know that they were, in fact, dealing with the downed American pilot.[354]

As the rescue helicopters, two MH-53 Pave Lows and an MH-60 Pave Hawk, moved into the area and called "two miles out," Serbian surface-to-air radars began targeting the A-10s. One of the A-10 pilots made an unusual transmission and called "Magnum," the code word used by the F-16 CJ pilots to denote the firing of a HARM anti-radar missile. No sooner had the pilot made the false call than the Serbians turned off their radars. At precisely the right moment, all aircraft began the extraction. The MH-60 located the survivor and moved overhead, and the two MH-53s circled overhead in a perfect Lufberry circle, each one covering a 180-degree arc around the actual rescue helicopter. Above them, the A-10s did the same and ensured complete 360-degree coverage over the pilot. The MH-60 Pave Hawk, call sign Gator-31, settled onto the ground and a pararescueman jumped out for the final authentication. A mere forty seconds later, Zelko was inside the helicopter and the entire mission began the race out of enemy airspace.[355]

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[353] Brian McLean, *Joint Training for Night Air Warfare*, 66; Christopher E. Haave and Phil M. Haun, eds., *A-10s Over Kosovo: The Victory of Airpower Over a Fielded Army as Told by the Airmen Who Fought in Operation Allied Force* (Maxwell Air Force Base, Ala.: Air University Press, 2003), 214-230; Darrell Whitcomb, "The Night They Saved Vega-31," Air Force Magazine, December 2006; Dale Zelko, transcript of speech in author's collection.

[354] Dale Zelko, transcript of speech in author's collection.

[355] Christopher E. Haave and Phil M. Haun, eds., *A-10s Over Kosovo*, 214-230; Darrell Whitcomb, "The Night They Saved Vega-31," Air Force Magazine, December 2006.

The combat search and rescue effort that night was "far from flawless" but proved the importance of the training scenarios the rescuers had practiced time and again. Zelko later indicated that the role of the equipment in his rescue was less important and instead pointed to a more important indicator for his rescue: "Technology and sophistication are very, very important, but what about the human? What about the operator? This combat search and rescue was successful because of the training and preparation."[356]

The members of the combat search and rescue crews later said that the rescue of Dale Zelko was the "most challenging; most intense; the most physically, mentally, emotionally exhausting peacetime or wartime mission" they had been involved in during their careers. Still, each and every pilot, whether flying a fighter, attack aircraft, or helicopter, had trained for this very particular type of mission at their home stations and at Red Flag. True, the aircraft were all technologically advanced, but so was the F-117 that had just been shot out of the sky. The key difference was the training.[357]

The six-hour rescue ordeal concluded on the very ramp from which Zelko had taken off earlier that night. Word spread quickly that Zelko was arriving on a C-130 at Aviano Air Base. Each member of his squadron, the A-10 pilots who led the rescue mission, and dozens of others gathered as the C-130 landed, taxied, and dropped its ramp. Zelko was greeted with raucous applause. As Hinman recalled, "The wing commander greeted him, followed by his squadron commander, and next in line was a young Airman First Class Katrina Carterer. Zelko spotted her, reached inside his flight suit, and withdrew the American flag he had carried on that mission for her. With the sun rising and the Alps in the background, it was like something out of a movie." The rescue of Vega-31, rather than being a failure involving the loss of aircraft, was a high point

[356] Dale Zelko, transcript of speech in author's collection.
[357] Dale Zelko, transcript of speech in author's collection.

in the Kosovo air war. However, the loss of the F-117 was not a trivial matter. The technology that fell into enemy hands that night could no longer be protected. If the F-117's technology was compromised that night, the Air Force would be forced to adapt existing training exercises to account for that possibility. Still, the rescue proved that Red Flag training scenarios for search and rescue missions were perfectly suited for real-world execution.[358]

The U.S. Air Force was transformed through the use of realistic training exercises, but this produced a gap between the capabilities of American pilots and those of other allied nations. The NATO allies were decidedly un-transformed. Allied Force clearly showed how large a divide had grown between American air power and that of its allies. Cesar Rodriguez opined that "one could argue that, in Allied Force, NATO was the Achilles heel of allied air forces when it should have [been] and needed to be the crown jewel." Lieutenant Colonel Steven Ankerstar, who flew F-15s during Allied Force, echoed Lieutenant Colonel's McLean's thoughts on the importance of night operations by pointing out that American pilots had trained for "lights out" night operations for decades, yet this was a mission that many allies were just not comfortable conducting.[359]

Allied Force demonstrated that for every action there is a reaction; the use of stealth in Desert Storm had led to other countries attempting to counteract it. Elements of the Serbian Army configured their radars to give them the best opportunity to detect the F-117. The downed F-117 also became something of a sore subject with many in the Air Force. The inability of Americans to destroy their own downed aircraft more completely meant that certain aspects of the low-observable aircraft probably fell into enemy hands that night. If the aircraft wasn't compromised before Allied Force, it certainly was after it.

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[358] Ellwood P. Hinman, interview with author, 15 November 2011.
[359] Cesar Rodriguez, email with author, 29 November 2011; Lieutenant Colonel Steven Ankerstar, interview with author, 15 December 2011; Brian McLean , *Joint Training for Night Air Warfare*, 67.

The compromise of the F-117 did not stop the Air Force from concluding that air power alone had delivered the ceasefire to NATO leaders. A RAND Corporation study conducted after the war yielded the book *NATO's Air War for Kosovo: A Strategic and Operational Assessment.* This study went so far as to reassert that Allied Force was "…the first time air forces had successfully coerced an enemy leader in the absence of significant friendly ground force involvement…" and that "NATO's bombing effort…played the determining role in bringing about Milosevic's defeat." These statements directly contradict the following facts. First, the air war was originally planned to last for forty-eight hours but instead lasted seventy-eight days. Second, Milosevic and the Serbian military showed great resiliency against the air campaign, to the point that many NATO countries believed the only way to stop the ethnic cleansing was a massive influx of ground troops. Finally, it was only after NATO threatened to use ground troops and Russia withdrew its backing from Milosevic that the latter agreed to a ceasefire.[360]

But what did operations in the Balkans say about the way the Air Force trained for war? The shoot downs of the F-16 and F-117 exposed no real flaw in the training paradigm. Even in an uncontested environment the occasional aircraft will be lost. Red Flag still demonstrated its merit even at the expense of other nations egos. As Cesar Rodriguez noted, American pilots operated on an entirely different level thanks in no small part to years of training for day and night missions. Blue Flag proved to be a more difficult training exercise to evaluate. Participants at Blue Flag were not instructed in how to wage a war of escalation nor were Blue Flag participants taught how to plan for operations led by the UN or NATO, although this undoubtedly should have been inserted into the training programs. Perhaps the biggest problem for air planners and pilots conducting operations was that there existed no training mechanism on

[360] "Operation Allied Force: Lessons for Future Coalition Operations," RAND Corporation, Project Air Force, 2001.

how to get organizations to work together coherently in combat. Planning for and flying in Red Flag was relatively simple. Lines of authority were clear, and the "enemy" was a more or less known quantity. However, planning and executing an air campaign where the United States was not the lead organization proved difficult to train to.

A second problem during campaigns in the Balkans was the clash of personalities, another thing that it was difficult to train for in an exercise environment. Whereas General Horner at least understood General Schwarzkopf during Desert Storm, there are strong indications that General Wesley Clark and his air component commander, Lieutenant General Michael Short, did not get along with each other. The importance and power of personality conflicts during military operations should not be underestimated, especially if those personality conflicts change or compromise the use of one military arm versus another. Training and technology aside, personality conflicts between senior leaders are never productive. Third was the lack of clearly defined objectives given to allied air planners prior to the beginning of hostilities. This again underscores the point that, although training prior to the campaign prepared pilots for aerial combat, the training for campaign planning itself showed a need for modification.

Nevertheless, there are many positive outcomes of the Balkan campaigns that can be tied directly back to Air Force training exercises. If one could overlook the failure to achieve NATO and UN objectives, the overall results of air power in the conflict, especially American air power, were quite impressive. In all, the Americans lost four aircraft during the conflicts. Among these, the Air Force lost two F-16s and one F-117. All three aircraft were lost to surface-to-air missiles and all three pilots were rescued, although in one case it took several days to accomplish the

task. In return, the American military destroyed six MiG-29s and at least four J-21s and two J-22s during the Banja Luka incident.

American Missile technology continued to be improved as well. After Desert Storm, 20 of 61 kills were accomplished beyond visual range. This was due in large part to the Air Force's use of the AIM-120 advanced medium-range air-to-air missile. Despite the great increase in beyond-visual-range kills, other factors showed that beyond-visual-range weapons were not nearly as effective as some claimed. Since its first use in 1992, the Air Force recorded ten AIM-120 kills, but four of those were not achieved beyond visual range. Furthermore, two were against non-maneuvering, fleeing aircraft, and none of the ten downed aircraft had actively employed electronic countermeasures. In each of these situations, the U.S. had a numerical advantage, and none of the enemy aircraft were equipped with similar beyond-visual-range weapons.[361]

Air combat during the 1990s continued to prove the value and efficacy of Red Flag, Blue Flag, and other training exercises. In essence, training events gave American pilots the opportunity to "dry run" a mission before actually flying it in combat. Air Force pilots' ability to plan for and execute very complicated missions in a tiny air space over the former Yugoslavia was something that they had developed in training on more than a hundred different occasions. Every Red Flag training mission and every sortie in what was called `continuation training' (the missions conducted daily at an aircraft squadron's home station) prepared American pilots for exactly these types of missions.

After 1975, the Air Force was transformed in the way that it trained for and executed aerial warfare. The training revolution directly led to the success of Operation Desert Storm.

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[361] John Stillion and John Perdue, "Air Combat Past, Present, Future," RAND report for Project Air Force, August 2008, http://www.defenseindustrydaily.com/files/2008_RAND_Pacific_View_Air_Combat_Briefing.pdf

After Desert Storm ended, the Air Force continued to expand its training exercises and an already existing gap in capabilities between the U.S. Air Force and allied air forces began to widen. Red Flag, Blue Flag and other training events continued to demonstrate their utility, but Air Force flyers were now so far ahead of some of the other allies that it was difficult to conduct operations alongside allied nations.

CHAPTER 10 - Conclusion

Since the end of American involvement in the Vietnam War, it has been training, and not technology, that has separated American pilots from its enemies when aerial combat commenced. There were several changes to training after the Vietnam War ended that aided in the creation of new exercises. First, the creation of the DOC statement allowed squadrons to train to a primary and secondary mission. Second, the building block approach to aerial warfare training improved a combat pilot's ability to close with and kill the enemy. Pilots learned step-by-step tactics to kill the enemy both at a distance and in a close-in dogfight. Third, the Fighter Weapons School taught advanced tactics to pilots who took their knowledge back to the squadron level. Finally, select groups of pilots had the chance to fly against actual MiG aircraft as part of the Constant Peg Program. There is strong anecdotal evidence in the public domain that, as of 2012, a version of the Constant Peg program still existed and that the Air Force was flying MiG-29s and perhaps Sukhoi manufactured aircraft and operating out of the Groom Lake facility. Steve Davies argued in Red Eagles that the Air Force continues to use MiG and Sukhoi aircraft to train pilots at both the weapons school and Red Flag exercises. However, the most important change to training after the Vietnam War was the creation of the Red Flag exercise in 1975. [362]

The Red Flag exercise was created in 1975 to prepare pilots for combat. It was created to help simulate a pilot's first ten combat missions after which the chance for survival greatly increased. In 2012, Air Force fighter pilot and combat veteran Dan Hampton stated: "if you can

[362] Mrozek, Donald J. "In Search of the Unicorn: Military Innovation and the American Temperament." *Air University Review,* XXXVII, no.6 (1986): 28-45. http://www.airpower.au.af.mil/airchronicles/aureview/1986/sep-oct/mrozek.html ; Steve Davies, *Red Eagles*, 328-329

defeat the Nellis `threat,' you can beat anything in the world." Credit for the creation of Red Flag belongs to Lieutenant Colonel Moody Suter, but it would never have reached fruition and maturity had it not been for Generals Dixon and Creech among others. After Red Flag, the Air Force established eighteen different exercises that bore the "Flag" name. These exercises trained participants in aerial warfare, command and control, aircraft maintenance during war, and other applications applicable to the way the Air Force conducts war. Of the eighteen different flag exercises, seven still existed as of 2013. The Air Force found that realistic training demonstrated results outside of the fighter and bomber forces. Beyond the flag exercises, dozens of other training events occur every year to prepare pilots for combat and to expose them to the types of dissimilar aircraft they may face in combat. Each of these exercises traced their origin to the training revolution that began after the Vietnam War.[363]

Technology has proven to be a somewhat fickle element in modern weapon systems, and the human element remains an important consideration in air power operations. Between May and September 2011, the entire fleet of the Air Force's F-22 Raptors sat grounded for more than three months. A problem with the aircraft's on-board oxygen-generating system caused several hypoxic events to affect the pilots. As a result, the technologicaly advanced aircraft sat under sun shades across five locations as the pilots became bored without their flying rotations. The loss of training due to a technical failure caused the pilots to lose their combat qualifications. In short, for a time, the world's most advanced air-to-air fighter became useless. After the F-22 returned to flying status in September 2012, a painstaking, months-long process began to ensure that the pilots were brought back up to the readiness levels necessary to employ the weapons system in combat. The building block approach, created in the 1970s, was used to bring the F-22

[363] Dan Hampton, *Viper Pilot*, 139-140

pilots back to a combat ready status and to ensure that the squadrons could meet the requirements of the DOC statements. In March of 2012, once the pilots had achieved the necessary qualifications, the F-22s began to rotate through Red Flag.

The Red Flag exercise continued to grow through the 1970s, 1980s, 1990s, and into the early part of the 21st century. The success of the Red Flag exercise led to dozens of foreign countries wanting to participate in the training exercises. Special training events were set aside each year to allow various countries to participate. Over the course of the 1980s and 1990s, the exercise grew to include night operations, electronic warfare, space and cyberspace operations, and "non-kinetic operations," as well as some events that were molded to simulate counterinsurgency environments. At its heart, though, Red Flag remained committed to training air crews to execute an air war in an operational theater. However, some pilots believed that even Red Flag had lost its luster and utility. In response to a questionnaire sent out by the general in charge of the United States Air Forces in Europe (USAFE), an unnamed fighter pilot sent back an updated version of the famous "Dear Boss" letter. In this letter, from 2009, the anonymous pilot stated:

> Even our former crown jewel Red Flag has become a joke. Instead of getting some folks good training, we decided to be all inclusive and get everyone some training. We wouldn't want anyone to feel left out in today's Air Force. So once again real combat capability suffers….God help us if we ever have an all-out air war. We are going to pay the price in blood on the backs of the minimally trained and inexperienced. We have learned these lessons before. We have been the hollow force. We have seen what blind

faith in technology with minimal training does to combat success. Have we forgotten everything we learned in Vietnam?[364]

There emerged two diametrically opposed perceptions. The first, was that Red Flag continued to be the world's most prestigious combat training exercise. The second was that it devolved into an all-inclusive training course for anyone who cared to attend. This included non-flyers and support personnel who did not benefit as much from their inclusion in the scenarios. In reality, the changes to Red Flag represented not a form of inclusion for all Air Force personnel, but a representation of innovativeness as the Air Force continued to adapt its training programs to perceived threats.

The emergence of the Red Flag training program and the numerous changes to the way in which the Air Force prepared its pilots for combat became possible because of the losses that occurred during the Vietnam War. After the Vietnam War, the Air Force converted from belief in a strategic bombardment theory to a commitment to tactical style of warfare with an emphasis on revolutionized training. As tactical fighters attained parity with strategic bombers, the terms strategic and tactical ceased to be useful. As the technologies of each command became interchangeable, the way in which the pilots trained for combat became more important. The training revolution became the basis for air superiority.

The rise of tactical training exercises allowed the tactical fighter forces to achieve superiority not only over the enemy but also equality with the strategic air forces. What emerged was theater air war. The dominance of this new style of war pervaded the Air Force after Vietnam and led to successes in the air during Operations El Dorado Canyon, Desert Storm, Deliberate Force, and Allied Force, among others. The changes in the Air Force during the

[364] Letter in Author's collection. Available online at: http://www.fighterpilotuniversity.com/wtfo/dear-boss-2011

period covered in this work resolved tactical and strategic concepts into one overarching type of aerial warfare, and they even improved relationships between the Army and Air Force when it came to battlefield coordination and execution. The training revolution that began in the 1970s changed the way the Air Force waged war.

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Desert Storm Files:

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Black Hole Files

Oral History Interviews:

General Creighton Abrams

General Lew Allen

Colonel John Boyd

General Wilbur Creech

General Robert J. Dixon

General Ronald Fogelman

General Merrill McPeak

Brigadier General Robin Olds

The Honorable T.C. Reed

General John Ryan

The Honorable John Stetson

Colonel Richard Moody Suter

Fifty-Seventh Wing Office of History

Red Flag Files

Aggressor Files

Weapons School Files

Air Force Historical Studies Office

Muir S. Fairchild Research and Information Center Documents Collection

Air Force Research Institute

George Washington University Desert Storm Archive

Appendix A - Air Force "Flag" Exercises 1975-Present

Air Force "Flag" Exercises 1975-Present

BLACK FLAG	1978-1985 This exercise involved logistic initiatives by TAC to train aircraft maintenance crews for the demands of high sortie generation during wartime activities. Unlike Red Flag where there were only two "goes" each day Black Flag trained to turn aircraft as many as four or five times to simulate a real world operation.
BLUE FLAG	Dec 1976-Current Designed to train and exercise the operational level of war. This exercise focused on command and control of several wings during wartime operations.
BRIGHT FLAG	1992-Current As part of the "quality" air Force movement in the early 1990s this exercise integrated all aspects of education and training.
CHECKERED FLAG	1978-1997 A realistic training exercise, not unlike Red Flag, for TAC (later ACC) and ANG units to train from wartime bases rather than home station. A version of this exists in 2012 as units deploy overseas to participate in other exercises
COALITION FLAG	Aug 1995 (cancelled before execution) Included in concurrent Green Flag operation. Operational level of war execution to include coalition members rather than an all American execution staff.
COPPER FLAG	1983-1992 Strategic air defense exercise against airborne threats to American Soil.

DESERT FLAG	Jan 1991 (only one on record) Based on the Red Flag model and designed to prepare for execution of Operation Desert Storm, essentially a dress rehearsal for conflict
GOLD FLAG	1977 An exercise designed to rapidly increase a junior pilot's experience level to a mission ready status in minimum amount of time.
GOLD FLAG	1989 Unlike its same-named predecessor Gold Flag in 1989 was a maintenance exercise that was scrubbed in favor of other on-going maintenance initiatives.
GRAY FLAG	1977-1979 Similar effort to the original Gold Flag, planned to rapidly increase the number of newly accessioned pilots in undergraduate pilot training to mission-capable pilots. It was cancelled because it drained resources from other exercises and was deemed too resource intensive.
GREEN FLAG	1981-Current A direct successor to Red Flag and operated concurrently this exercise focused on the tactical force's conduct electronic warfare operations. Green Flag was later merged into Red Flag exercises. However, in 2006 another Green Flag was initiated that focused on the close air support mission.
MAPLE FLAG	1978-Current Designed on the Red Flag model and operated in Canada to better simulate the European Theater of war and force crews to exercise in restricted airspace.

OLYMPIC FLAG	1992 ACC's first strategic missile exercise after the inactivation of SAC and the movement of those missions under the newly established ACC.
RED FLAG	1975-Current The Air Force's premier realistic training exercise to increase tactical pilot's ability to survive in combat operations. Meant to simulate a pilot's first ten combat missions after which point the chance of survival rapidly increased.
SILVER FLAG/EAGLE FLAG	1978-Current Also built on the Red Flag Model but was the first exercise to train support personnel, especially civil engineers, for combat operations.
SILVER FLAG ALPHA	1981 Designed to train security police for air base defense, rolled into Silver Flag and later Phoenix Readiness/Eagle Flag
VIRTUAL FLAG	2000-Current Fiscal constraints and technological expansion afforded the ability for crews to receive exercise training across bases through the use of linked aircraft simulators.
WARRIOR FLAG	1997 (Only one on record) Replaced one of the year's Blue Flag exercises. Like Blue Flag, it focused on theater battle management. It also included live-fly operations and participation of ground controllers.

Appendix B - USAF Constant Peg Announcement

11/13/2006 - **WASHINGTON (AFPN)** -- After decades of secrecy, Air Force officials acknowledged Nov. 13 that Communist-built fighters were flown at the Tonopah Test Range northwest of Las Vegas, Nev.

From 1977 through 1988, the program, known as ***Constant Peg***, saw Air Force, Navy and Marine aircrews flying against Soviet-designed MiG fighters as part of a training program where American pilots could better learn how to defeat or evade the Communist bloc's fighters of the day.

Brig. Gen. Hawk Carlisle, the 3rd Wing commander at Elmendorf Air Force Base, Alaska, is a former member of the 4477th Test and Evaluation Squadron and remembers the valuable training the unit provided.

"CONSTANT PEG afforded pilots an opportunity to learn how to fight enemy aircraft in a controlled, safe environment without having to endure the risks of actual air combat," said General Carlisle. "Typically a pilot would start with a basic familiarization flight to observe the enemy airplane and study its characteristics, practicing one-on-one defensive and offensive maneuvers against it, and finally, experience multi-bogey engagements high over the desert scrubland of the Nellis Air Force Base ranges."

As a result of marginal performance of American fighter forces in the skies over North Vietnam, Constant Peg complemented other revolutionary training programs such as Red Flag and Top Gun, and the Air Force and Navy-Marine aggressor squadrons. The program also was intended to eliminate the "buck fever" or nervous excitement many pilots experience on their first few combat missions. Historical experience indicated that pilots who survived their first ten

missions were much more likely to survive a complete combat tour, and Constant Peg was intended to teach them the right "moves" to enable them to come out on top of any engagement.

The end of the Constant Peg nearly coincided with the end of the Cold War, by which time some of its graduates already had proven themselves in actual air combat.

Threat aircraft flown by the Red Eagles spanned several decades and technical generations of capability. There was the MiG-17 Fresco, a small, agile single-seat transonic fighter placed in service just after the Korean War and used extensively over Vietnam and the Middle East; the MiG-21 Fishbed, a high supersonic fighter used world-wide in large numbers, and the swing-wing MiG-23 Flogger, likewise in global service, an attempt by the Soviets to match the sophisticated capabilities of the F-4 Phantom.

"Although it came too late to influence Vietnam, Constant Peg training greatly influenced the success of American Airmen in Desert Storm, who shot down 40 Iraqi fighters, many of which were Fishbeds and Floggers," said General Carlisle.[365]

[365] Air Force News Release, "Air Force Declassifies Elite Aggressor Program," 13 Nov 2006, retrieved 24 Sept 2012, http://www.af.mil/news/story.asp?id=123031752